

MASSACHUSETTS
HIGHWAY COMMISSION

YEAR ENDING NOVEMBER 30

1915

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TWENTY-THIRD ANNUAL REPORT
OF THE
MASSACHUSETTS
HIGHWAY COMMISSION,

FOR THE FISCAL YEAR ENDING NOVEMBER 30, 1915.

JANUARY, 1916.



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The Commonwealth of Massachusetts.

To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts in General Court assembled.

The undersigned commissioners, appointed under the provisions of chapter 476 of the Acts of 1893 and of chapter 474 of the Acts of 1900, herewith submit their twenty-third annual report, in accordance with the provisions of chapter 47 of the Revised Laws, for the fiscal year ending Nov. 30, 1915.

WM. D. SOHIER.
F. D. KEMP.
JAMES W. SYNAN.

BOSTON, MASS., Jan. 5, 1916.

ANNUAL REPORT OF THE MASSACHUSETTS HIGHWAY COMMISSION.

The Board consists of the same members as last year. Mr. James W. Synan was reappointed by Governor Walsh on June 25, 1915.

ORGANIZATION.

The Commission has under its charge road work, the registration of motor vehicles and the licensing of the operators thereof, as well as the investigation of automobile accidents. There is a department for the highway work and another for motor vehicles, with a separate division for the investigation of accidents and the examination of operators. A chart is included in the 1913 report, showing the organization more in detail.

HIGHWAY DEPARTMENT.

This department has charge of all road and bridge work, advice to municipal authorities, etc. At the head of it is the chief engineer, A. W. Dean, whose assistant is S. A. Parsons. The office engineering department, which makes the surveys, prepares all plans and estimates, etc., is in charge of A. M. Lovis. In this department are employed from 60 to 120 engineers, draftsmen, instrumentmen and rodmen, depending on the season of the year and the amount of work on hand.

The State is divided into four divisions, each in charge of a division engineer, and each division engineer has one or two assistants in charge of particular work, like "small town" work, maintenance, etc., and as many resident engineers are assigned to his division from time to time as are necessary to supervise and inspect the actual work which is in progress.

Division I. is in charge of J. A. Johnston, with headquarters at Springfield, A. D. Dadley and H. D. Phillips being the

assistant division engineers. This division includes most of Berkshire County, Hampden and Hampshire counties and a large part of Worcester County.

Division II. is in charge of C. H. Howes, with headquarters at Greenfield. This division includes Franklin County, a part of Hampshire County, and many towns in the northern part of Worcester County; also the road down Hoosac Mountain into North Adams.

Division III. is in charge of F. C. Pillsbury, whose assistant division engineer is D. H. Dickinson. The headquarters of this division are at Boston, the division including the eastern part of Worcester County, Middlesex, Essex and Suffolk counties and a part of Norfolk County.

Division IV. is in charge of W. R. Farrington, with H. C. Holden as assistant division engineer. This division includes part of Norfolk County and Bristol, Plymouth, Barnstable, Dukes and Nantucket counties, the headquarters being at Middleborough.

Most of the principal engineers and assistants have been in the service of the Commonwealth for over ten years, and quite a number of them for a much longer period of time.

The several departments report to the Commission through its secretary, F. I. Bieler. His assistant is Fred Fair.

The records of the Commission, etc., are in charge of the recording secretary, Miss Mary A. Riley. The accounting department is in charge of John M. McCarthy.

MOTOR VEHICLES.

The automobile department, which is engaged in the registration of motor vehicles and the licensing of the operators thereof, including the collection of fees therefor, is under the charge of E. J. O'Hara. In this department there are from 50 to 100 assistants, clerks, stenographers, shippers, packers, etc., depending on the season of the year.

EXAMINATIONS AND INVESTIGATIONS.

This subdepartment, which conducts all the examinations of applicants for chauffeurs' licenses, etc., and investigates motor vehicle accidents, is in charge of F. L. Austin. There are 11

other examiners and investigators employed in this work. Another investigator has been appointed, who will begin work Jan. 1, 1916.

HEARINGS.

During the year 432 hearings were given on automobile complaints and accidents and matters relating to the registration and operation of motor vehicles.

Public hearings were given on special regulations made by municipal authorities affecting the use and operation of motor vehicles in Somerville, Revere and Worcester.

There were 15 hearings given on petitions for the location, extension and relocation of street railways on State highways.

In addition to the regular hearings held in each of the 14 counties, the Commission gave many hearings on petitions from various cities and towns for State highways or for aid in the improvement of town ways.

Besides these formal hearings given at the office or elsewhere to the authorities or representatives of the cities or towns, one or more members of the Commission met the municipal authorities, or inspected the roads to be built or improved by the municipalities or otherwise, in more than three-quarters of the towns in the Commonwealth.

STATE HIGHWAYS.

During the year ending Nov. 30, 1915, the Commission completed work on about 63 miles of State highway, portions of which were laid out in 1914. Construction was commenced, but not completed, on over 13 miles of roads in 22 cities and towns. Layouts were made of about 62 miles of State highway in 44 cities and towns. The total length of State highways at the end of the year was 1,101.32 miles.

The total expenditures by the Commission for the construction of State highways since the work began, including the planting of trees, amounts to \$11,149,621.95. It must be remembered that the counties repay to the Commonwealth one-fourth of the cost of constructing these highways.

On Sept. 30, 1915, the total amount of bonds issued was only \$9,360,000. The sinking fund established by law to extinguish these bonds amounted to \$2,924,127; consequently, the net

debt was only \$6,435,873. The expenditures had been over \$11,000,000; the net debt was for less than \$6,500,000.

In this connection it should be remembered that in the past three years the amount that the Commission was authorized to expend, and the State to borrow, was increased from \$500,000 to \$1,000,000 a year; consequently, the amounts expended in these last three years have been nearly \$3,000,000 of the total of \$11,000,000.

The Commission feels safe in saying that the State highways could not be replaced in the condition they are now in, although some of them are over twenty years old, for considerably more money than the amount of the net debt, and it doubts if they could be replaced, with the great increase in the cost of labor and materials, for the gross amount of bonds now outstanding.

Until 1913 there was only \$500,000 a year available for the construction of State highways and for the work on "small town" roads, \$75,000 of that amount going into the towns. The Legislature in 1912 authorized the expenditure of \$5,000,000 during the following five years, not more than \$1,000,000 to be spent in any one year for the above purposes. Of this amount, \$150,000 is to be expended upon the "small town" roads, \$100,000 of which is only available in case the towns contribute a like amount.

PETITIONS.

There were 944 petitions filed by the cities and towns for the laying out of State highways before this year, these petitions covering 2,215 miles of road. This year 30 petitions were received, covering 160 miles of road, making a total of 974 petitions now on file, covering about 2,275 miles of road in 33 cities and 296 towns.

SURVEYS, ESTIMATES AND DESIGNS.

During the year preliminary surveys, plans and estimates were made on contemplated State highways in 33 towns, covering an aggregate distance of 58.61 miles. Lines and grade for construction work on State highways have been made in 49 towns, covering an aggregate distance of 71.7 miles. Of this, 14.7 miles was for resurfacing work. Some of this work was done on roads where construction was commenced in 1914.

Final surveys and measurements were made on completed State highways in 44 towns, covering an aggregate distance of 60.68 miles.

On "small town" and "motor vehicle fees fund" work, so called, preliminary surveys, including plans and profiles, were made in 89 towns, covering an aggregate distance of 67.72 miles. Line and grade for construction has been made on these roads in 95 towns, covering an aggregate distance of 84.0 miles.

In addition to the above, surveys have been made in 7 towns, covering an aggregate distance of 14.7 miles, said roads to be constructed by the town, and line and grade for construction for this class made in 3 towns, covering an aggregate distance of 5.0 miles.

Under special acts of the Legislature, surveys have been made in 7 towns, covering an aggregate distance of 13.86 miles, and line and grade for construction made in 5 towns, covering an aggregate distance of 11.3 miles.

Under the "western counties" appropriation (chapter 221, Acts of 1915) surveys have been made in 31 towns, covering an aggregate distance of 92.39 miles, and line and grade for construction made in 22 towns, covering an aggregate distance of 31.6 miles.

Layout plans have been made of roads in 43 towns, covering an aggregate distance of 62.29 miles.

Plans to accompany decrees for street railway locations on State highways have been made in 30 towns.

Roads constructed in 1915.

Construction has been completed on 60.07 miles of State highways, 44.97 miles of highways under the provisions of the "small town" act, 62.32 miles of highways under the provisions of chapter 525 of the Acts of 1910, and 14.56 miles of highways under the provisions of special acts, making a total of 181.92 miles completed during the year.

Of the above roads completed this year, 23.26 miles were of water-bound macadam; 58.60 miles were of gravel; 4.13 miles were of sand bound with oil and asphalt; 38.62 miles were of bituminous macadam, that is, macadam with bituminous binder incorporated in the top course; 19.62 miles were of

water-bound macadam with an oil surface applied; 7.65 miles were of gravel with the top surface bound with bituminous binder; 5.34 miles were of cement concrete; 16.61 miles were of gravel with an oil surface applied; 1.30 miles were of Warrenite; .09 of a mile was of granite block on a concrete foundation; and 6.70 miles were dirt roads, that is, surfaced with the best available material.

Sand and Asphaltic Oil Roads.

So far as the Commission has been informed, it was the first to experiment to see what could be done to construct a road of sand mixed with some bituminous material.

There are long stretches of road on Cape Cod and in the southeastern portion of the State where there is no stone or gravel or other materials commonly used in constructing highways. There is sand and nothing but sand in many places.

Broken stone has to be imported and often costs \$2 a ton on the cars, and after that there is a long and very expensive haul because it has to be transported over a sand road where a two-horse team could only haul about one ton to the load. In many places the highway to be built was from 5 to 8 miles from the nearest railway station. The cost of constructing a stone road was consequently nearly prohibitive.

Sand and Oil Experimental Road, 1905.

Ten years ago, in 1905, the Commission decided to build a road of sand and asphaltic oil on the Cape in Eastham. There were no precedents which could be followed because no work of this character had been done anywhere on sand, though oil had been used on dirt in California. At that time there were no machines here that would spread the asphaltic oil evenly, even by gravity.

Sand and Oil Layer Method.

The old sand road was graded, and about three-quarters of a gallon of hot asphaltic oil per square yard was spread on it and covered with all the sand the oil would absorb. Another three-quarters of a gallon of oil was spread on top of this layer, and this again was covered with sand, and on this layer one-half of a

gallon of oil was spread and covered with sand. It was not possible with the crude methods then employed to spread the oil at all evenly; it ran into the ruts made by the carts and into the sixteen hoof prints made by the four horses that hauled the old watering cart that contained the heated oil.

Consequently that year and the next the surface had to be broken up, cut into as small pieces as possible with a disk harrow, harrowed and mixed with a tooth harrow, and then shaped back and rolled. After that certain places needed more oil and had to be patched. A reasonably passable road was secured in about two years at a cost of under 25 cents a square yard for the surface, or less than \$2,250 a mile.

This road is still in existence. It has required more oil from time to time, ruts have had to be filled and bunches on the sides cut off by hand or with a road machine. It has, however, carried the traffic for these ten years satisfactorily and is still on the job. The cost of maintenance on this road since 1905 has been on the average 2 cents a square yard a year, or about \$175 a mile a year.

Improvement in Methods of Construction.

Since that road was built, the Commission has constructed about 25 miles of roads made of sand and asphaltic oil by this layer method. The methods used in construction have been much improved.

The first and perhaps most important improvement is the hardening of the subgrade before any oil is spread. After the road is graded the subgrade is prepared of the required width (now 18 feet; formerly 15 to 16 feet) and this is hardened with clay or loam so that it is not much rutted by the wheels or pitted by the horses' hoofs when the cart containing the oil is hauled over it. The oil is immediately covered with the sand before any teams go over it and pick it up. This makes it possible to spread the oil evenly over the road surface before it is covered with sand.

The second improvement is the machinery used to spread the oil. There are now a number of especially equipped carts and trucks made with nozzles especially designed to spread the oil in a perfectly uniform surface over the road.

The best ones spread it under pressure obtained in several ways: by a pressure obtained in a tight steel tank by steam secured from the tractor that is used to haul the tank wagon; by steam obtained in the same way operating a pump on an oil-spreading device attached to the tank wagon; by a gasoline pump mounted on a tank wagon; by a pump driven by a sprocket and gear attached to the back wheels of a tank wagon hauled by horses.

The motor trucks have especially designed machinery for spreading oil under pressure. The very heavy asphalts are usually, if not always, spread under pressure made by an air pump.

Many of these tank wagons and trucks have burners or coils for heating the oil and keeping it hot; consequently, it is spread more evenly and mixed more readily, also, a better quality of oil can be used, — one containing more asphalt.

Cost of Sand and Oil Roads, Layer Method.

Twenty-five and one-half miles have been built by the Commission since 1905. The surface of these roads has cost from 21 to 33 cents a square yard, the average cost being 26 cents a square yard. For a road 18 feet wide this would be \$2,750 a mile, to which should be added the cost of grading, culverts, etc.

On the roads which have been in use at least five years, the average yearly cost of maintenance has been 1 cent a square yard, or about \$100 a mile a year.

The Eastham road has cost about twice as much for maintenance because of the crude methods used in its construction.

Besides these 25 miles of sand and oil road built by the Commission, there is on the Cape probably an equal mileage built by the towns themselves or under the "small town" act, under specifications obtained from the Commission.

Sand and Asphaltic Oil, Mixing Method.

In 1908 the Commission constructed the second section of sand and oil road that was built. This was constructed by the layer method. It took two years to get it into reasonably good condition.

It, therefore, seemed as if there might be some way of using the same or better materials and mixing them thoroughly, thereby securing a stronger and better road without too much increase in the cost.

Experiments in Mixing Sand and Bituminous Materials.

In the fall of 1908, therefore, the Commission decided to try some experiments with various bituminous materials mixed with hot sand. Eleven sections of road were constructed and a different bitumen was used on each. Two qualities of tar were used and nine different oils or asphalt products.

In each case the subgrade was carefully prepared of the required width, and the mixture was spread as evenly as possible thereon and rolled with a light roller. The mixture was 4 inches thick in the middle and 3 inches thick on the sides. The sand and the bituminous materials were first heated, and then mixed by hand as thoroughly as possible, before being spread on the road.

Eight of these experimental sections practically failed within the year. Another section was never very satisfactory, and only two remained in good condition and are still in use, having been patched from time to time. The only sections that succeeded were the ones where a heavy oil with an asphalt base was used, or where this oil was used mixed with an equal quantity of A asphalt. This latter section was much better than the other two.

These experiments showed clearly that it was possible to build a satisfactory road with sand mixed with oil asphalt if the proper asphalt product was secured and used. From 18 to 20 gallons of bitumen were used to the cubic yard of sand. The cost varied from 17 to 31 cents a square yard.

Roads built of Sand and Asphaltic Oil, Mixed.

The success of the asphaltic oil sections encouraged the Commission to go on with the work, and in 1909 over a mile of road was built by the mixing method. This road proved a success, although the oil used was rather light and consequently there was a little tendency to rut. Also, this road was surfaced only 15 feet in width, with the result that vehicles in passing each

other often turned out into the soft sand shoulder and sheered off the sides of the hardened road surface. It was rapidly cut into and narrowed up, especially on the curves.

The second year it was all widened to 18 feet, with a greater width on the curves, and all the roads of this character that we are now building are 18 feet in width, with 21 feet on the curves. The Commission is widening the older roads as fast as it can.

Improvement in Methods, Machinery and Asphalts.

We are now using an asphaltic product that contains more asphalt than was used at first. Various asphalts have been used, both residuum and natural, and on this mixed work an oil asphalt is now used that tests 80 penetration on a Dow penetrometer.

New mixing machines have been made, and their use insures a much more even mixture of the sand and oil. Until this year the sand has been heated on sheets of iron with a fire underneath, or over old boiler plates or pipes. The sand had to be constantly turned by hand, but even then occasionally some of it was too hot and got burnt, and some was not hot enough. Now several sand heaters have been designed and have been used with good results. In these the sand is kept in motion all the time it is being heated, insuring a uniform heating of the sand.

It has been found advisable to spread a sealing coat of asphaltic oil of a little lighter quality over the road after it has been rolled, covering this with sand. The engineers are careful to secure as good a quality of sand as possible, and sand of a good quality can usually be obtained on Cape Cod. This means a sharp, strong sand that is pretty well graded in the bank. These sands have been tested and found to correspond very closely with the sands used under the ordinary sheet asphalt specifications.

The quantity of oil asphalt that is used has to be varied a little according to the variations in the quantity of voids in the sand. Eighteen to 21 gallons are used to the cubic yard of sand.

The roads are still built over a carefully prepared and

hardened base, about 4 inches thick in the middle and 3 inches on the sides, 18 feet in width, with 21 feet on the curves.

Better results have been secured by using a road scraper and keeping the mixture constantly shaped while it is being rolled. As stated above a seal coat of a lighter oil improves the road surface and prevents it from having occasional potholes, and decreases the cost of future maintenance.

Mixed Sand and Oil Roads constructed.

The Commission has constructed over 23 miles of mixed sand and oil asphalt roads since the experiments made seven years ago in 1908. It has also built over $1\frac{1}{2}$ miles of sand mixed with tar.

The cost of these sand and oil asphalt roads has varied from 40 to 61 cents a square yard, the average cost being 52 cents. This cost would be somewhat less with oil asphalts at their present prices.

The average cost of maintenance per year on these mixed roads that have been in use five years has been $1\frac{6}{10}$ cents per square yard per year; on roads that have been in use three years the yearly cost of maintenance has been three-quarters of a cent a square yard. If these roads require a seal coat every four or five years, as seems probable, the average yearly cost of maintenance will be about $2\frac{1}{2}$ cents a square yard a year.

Roads that have failed.

Some sections of sand and oil roads have failed, and one section of sand and tar was not successful. These were roads built several years ago, and the failure was undoubtedly due to the poor quality of the oil asphalt or tar that was furnished and used, because these comparatively short sections have been rebuilt or repaired with a better quality of oil asphalt and have proved satisfactory.

While all the materials used were tested in a laboratory, there was very little knowledge a few years ago as to what qualities were necessary either in asphaltic oils or in tars to make a good road. Now that the Mexican and other asphaltic oil fields have come into use, it is much easier to secure good oil asphalts and good results than it was formerly. The manufacturers of both

the tars and the asphalts have also learned what is needed and have greatly improved their processes of manufacture, and also have used greater care to secure uniform product.

Where Sand and Oil Asphalt Roads can be used.

They can be used only where a sand of the right quality is available, and under present methods can be used only where the traffic is mostly light teams and automobiles; they will not stand up if they are used by many heavily loaded teams every day.

The layer roads are more easily rutted by teams than are the mixed roads, for two reasons: first, one cannot use as heavy a quality of asphaltic oil because it cannot be made to mix with the cold sand; second, because by the layer method one can never secure as even a mixture of the sand and oil on every part of the road.

Traffic carried successfully.

The traffic that has been carried successfully as shown by the traffic census taken in 1909, 1912 and 1915 is about as follows, the figures being the average daily traffic:—

Eastham, 1905 road, layer method: 20 heavy teams, 17 light teams and 253 automobiles.

Sandwich, mixed method: 8 heavy teams, 23 light teams and 502 automobiles a day.

Plymouth, mixed method: 3 heavy teams, 8 light teams, 257 automobiles. (This last count was made on a through road a long distance from any settlement. The other counts were near small villages and carried local traffic.)

There has been some fear that heavy motor trucks may injure these roads, though the road in Plymouth carried 8 and the road in Sandwich 9 motor trucks a day on the average with no appreciable damage to the road.

Future Improvements in Roads of this Character.

If the traffic in the future proves to be too heavy for the roads built by the methods above described, the Commission has no doubt that they can be greatly improved and strengthened at a moderate increase in cost by using better and harder asphalts and greater care in selecting and grading the sand, also

in heating and mixing. The sands can be carefully graded, a portable sheet asphalt plant can be used, thus insuring uniform heating and mixing, and the best quality of asphalt can be used. By this method a standard sheet asphalt pavement can be made and laid 2 inches in thickness, using the old sand and asphaltic oil roads as a base. The same material can be used to resurface the old water-bound macadam roads in those sections of the State where sand of the right quality is available.

The Commission has very little doubt that such roads will satisfactorily carry any traffic that will go over them for many years to come.

Up to the present time where the sand and oil asphalt roads are being built, there is not enough heavy traffic to warrant the additional expense. The Commission expects, however, to use this better material in resurfacing some of its older roads on the Cape where there is heavy team traffic.

A Word of Caution.

So many engineers and county commissioners from other States have come to Massachusetts to see these sand and oil roads, and so many letters of inquiry have been received asking for specifications and directions for building these roads, that the Commission feels that it should as emphatically as possible state a few facts.

A good road cannot be built by the use of any old oil, even if the agent selling it states that it is full of asphalt. An oil asphalt of good quality that will bind and not lubricate must be used. The quality of the oil and the asphalt in it can be determined by using the standard tests. Then make sure that all the oil asphalt used comes up to the standard. Do not let them send one carload with asphalt of the proper penetration and two or three others that are altogether too light. Send them back, do not use them, charge the freight to the seller.

It is not every sand that can be used. Many sands are too fine, too uniform in size, too rounded and not strong enough. The sand used by the Commission is hard, strong and sharp, and is found well graded in the banks. The only way to insure success is to use the proper materials and proper methods.

Before any contract is let or any large amount of work is undertaken, it would be wise to build some experimental stretches of road, using the materials expected to be used in practice. In warmer climates it will undoubtedly be wise to use harder oil asphalts than we have been using.

When the traffic is heavy it will undoubtedly be economical to grade sands, possibly add some stone, use a percentage of cement to make a denser mixture if the sand is not of good quality, use a portable asphalt mixer, and construct a sheet asphalt road or a Topeka mix. Build roads so wide that they are not rapidly destroyed by teams having to turn off the road and so shearing off large slices on the sides.

Constant Maintenance.

There is no class of road built that will go to pieces any quicker than roads of the above character, if they are not constantly maintained. A pothole in wet weather will soon become as big as a bushel basket, and with many holes of this kind the road is not only very quickly destroyed by the traffic but it becomes impassable. Thousands of dollars are lost every year because this maintenance is neglected, the holes not being filled.

This does not mean a great expense; the costs are given above. Even when the greatest care is used in constructing the road, a few holes may develop, perhaps only three or four to the mile the first year or two; inspect the road, fill the holes, spend a few cents and save hundreds of dollars.

Maintenance begins when construction ends. Keep it up.

LOCATION OF STATE HIGHWAYS (THROUGH ROUTES).

The Commission has continued its policy of filling in the gaps on the main lines of travel as rapidly as possible, building those sections in the smaller and poorer towns which could not afford to build or maintain roads of the character necessary to sustain the immense through traffic to which they are now subjected.

In the communities that were able to help themselves, the Commission has co-operated wherever possible. During the past two years the counties, cities and towns have co-operated and built connecting roads, or made appropriations to aid in

improving the main routes, to a much greater extent than ever before. The amounts so appropriated and expended during the past two years are certainly twice if not three times as much as the average amount expended in former years. Now most of the counties are co-operating, and nearly one-half of all the municipalities have made appropriations for the purpose of improving through routes.

Western Massachusetts.

Last year the Mohawk Trail was completed and opened to travel, connecting Greenfield with North Adams, so that there is a through route in reasonably good condition running east and west in the northern part of the State. This route runs from Boston via Concord, Fitchburg, Athol and Greenfield to North Adams.

Between Greenfield and North Adams there are still some 16 miles of what is practically a good country road that has been widened and improved but where the surface is a poor gravel, and the road will have to be constructed of stronger materials because of the constantly increasing traffic. That this new road and the Mohawk Trail are much appreciated by the public is shown by the fact that over three thousand automobiles passed over the trail on the Sunday before Labor Day.

The Mohawk Trail itself was described in last year's report. It was surfaced with the best materials available, which were not very good, being a poor loamy gravel on the west side of the Trail and a sort of hardpan on the east. It was oiled on the east side last year, and the whole road was oiled this year with a light asphaltic oil covered with sand.

It has been maintained all the year in reasonably good condition by being dragged with a log-drag whenever it was necessary, and by having all holes and ruts filled and kept in constant repair.

There have been quite extensive slides on the high banks, and there were some very severe rains or cloud-bursts this year which did a tremendous amount of damage to the roads between the Connecticut valley and eastern Berkshire. Cold River rose 12 feet in a few hours, and in some places washed out the road for nearly three-quarters of its width. There were

bad washouts in several other places on the trail, but they were temporarily repaired in a few days so that the road was reasonably passable.

The Commission arranged to have rip-rap put in where the Cold River did the most damage to the trail, and to have the channel cleared and widened on the opposite side from the road to prevent future washouts.

The Mohawk Trail ends at the bridge across the Deerfield River, nearly 2 miles west of Charlemont village.

Black Brook Road.

As was stated in last year's report, the town of Savoy, with a population of only 503, appropriated \$2,000 for the construction of a road to connect the Mohawk Trail with the settlement of Brier in that town.

If a road about a mile long were built, it would provide this part of the town with a way into North Adams on the west and Charlemont on the east that was some 6 miles shorter than the route they were using.

The understanding was that the Commission should use the \$2,000 appropriated by the town and provide the additional money that was estimated for this construction, the preliminary estimate being \$7,000 for the State's share. The road as constructed cost the State about \$9,700.

The country that this road went through is extremely rough and hilly, and it was impossible to secure any good grade at any justifiable expense. It was possible, however, to construct a road with a maximum grade of 12 per cent., and a minimum width of 12 feet, with turnouts within sight of each other, and the construction was started last year. The work was completed this year, the total cost being about \$11,700 because of the nature of the country.

Charlemont.

The gap between the Mohawk Trail and Charlemont village has been constructed of gravel, 18 feet in width, and coated with light oil, at a cost of about \$14,000.

A survey has been made and a contract let for the construction of about 2 miles of road east of Charlemont village on the road towards Shelburne Falls.

The road beyond over Shelburne Mountain was very badly

washed out during the heavy rains, but has been put in good condition again. This road was graded and widened several years ago, the Commission allotting money from the motor vehicle fees fund and the Legislature making special appropriations. This was the best that could be done at that time with the money available.

The best grade that could be secured on the old highway over the mountain was in places 12 per cent., and the road has never been in very good condition in wet weather, the only material that could be obtained being poor hardpan in places and sandy gravel in others. Now that the route is becoming of so much importance, the Commission intends to have further studies made and some survey lines run to see if it isn't possible to find another location where much better grades can be secured. If such a location can be found and the road can be constructed for any reasonable expense, a State highway can be laid out and constructed thereon which will allow the old road to be used while the new one is being constructed.

Charlemont to Hoosac Tunnel.

This is the old road over Florida Mountain. It has now been widened from the bridge over the Deerfield River where the Mohawk Trail crosses to Zoar, and has been graded its entire length, and is now a reasonably good country road. The road from Zoar up Pelham Brook to Rowe is nearly completed.

Pittsfield-North Adams.

This route is practically completed so far as State highway is concerned, there being a practically continuous State highway through all the smaller towns and in the sparsely settled districts.

The road between North Adams and Williamstown is also State highway.

Pittsfield-Williamstown.

The Commission has been co-operating on this route for several years, the Legislature allotting \$10,000 in 1914, and the Commission and the county allotting \$11,000 for use on this route in the towns of New Ashford and Lanesborough during the last few years.

In Williamstown the town and the Commission had constructed at joint expense a water-bound macadam road towards South Williamstown in 1912, 1913 and 1914, and about $3\frac{1}{4}$ miles had been built. This road has this year been completed to South Williamstown, a distance of about $1\frac{1}{4}$ miles, the town paying for the construction of a concrete bridge and for about one-half the cost of constructing the road.

In New Ashford and Lanesborough work has been done since 1912, using special appropriations and the money allotted by the Commission and the county. About $3\frac{1}{2}$ miles of road have been improved in New Ashford, and nearly 4 miles in Lanesborough. The work consisted of widening, building culverts, putting in a stone foundation where necessary, and surfacing with the best gravel obtainable.

In New Ashford considerable work has been done this year, the county paying a part of the cost, and in Lanesborough about $2\frac{3}{4}$ miles of gravel road has been completed this year, the county also helping on this road.

There remains to be built about $2\frac{1}{4}$ miles to complete the road from South Williamstown to the New Ashford line.

In Lanesborough, leaving out the village street, there is about $1\frac{1}{2}$ miles of road to be built to reach the Pittsfield line.

The city of Pittsfield has constructed a good road for part of the distance on this line this year, and will undoubtedly make such improvements as are necessary on the city streets on this route.

From North Adams to the Vermont Line.

The Commission has been working for several years on this route in co-operation with the town of Clarksburg in building a gravel road. This year a little over a mile was constructed, completing the road from the end of the State highway in Clarksburg to the Vermont line. The road beyond in Vermont has been improved in spots from Stamford to Hartwellsville.

An old wooden bridge on this route just north of the State highway in Clarksburg has been in dangerous condition for several years and must be rebuilt. Plans have been made for the construction of a concrete bridge, and the matter has been taken up with the authorities of the county, the town and the street railway company. The county and town have each agreed to pay \$2,000 towards the cost, and the Commis-

sion will allot the additional money necessary to construct, unless the street railway company wishes to come in and use the bridge, in which case they must pay the cost of the additional width that must be built. The bridge can be located so as to improve greatly the alignment of the highway and to straighten two rather sharp curves.

Albany to Springfield.

This route has been practically completed so far as construction is concerned, but it has required constant maintenance, patching, etc. On certain sections the road has been widened and resurfaced, and, as soon as the money is available, all parts of this road that are wearing out should be resurfaced, and at the same time the hardened surface should be widened from 15 to 18 feet and probably 21 feet on the curves, which should be banked as well. In quite a few places on this road there are extremely bad curves where only careful operation will prevent accidents. Where it is not too expensive, the Commission will widen the road and improve the view, but this work will be extremely expensive on a few curves where there are high ledges.

Springfield to Stockbridge.

The route from Springfield to Pittsfield runs through Lee and Lenox and is completed, but there was a gap between the State highway at East Lee and South Lee on the road from Lee to Stockbridge. This is on the direct road from Springfield to Stockbridge.

The road has been completed this year, about $2\frac{1}{3}$ miles having been constructed with a macadam and stone base, the top 2 inches being grouted with an asphaltic product.

In connection with this work a new concrete bridge was built over the Housatonic River. The town of Lee appropriated \$10,000 towards the cost, and the Commission allotted \$43,000 for the construction of the highway.

The State highway was laid out to connect with the road to Lee, and at the same time the short section of road running under the street railway tracks was constructed to connect directly with the road to Springfield, and \$2,900 was allotted for the work from the motor vehicle fees fund.

Monument Mountain.

On the route between Stockbridge and Great Barrington, there are a good many miles of town road, and there is one hill with quite a bad grade, "Monument Mountain," so called.

At the request of the town of Great Barrington, the Commission has had a survey and careful study made to see if this road cannot be relocated or the grades substantially improved, especially some of the extremely dangerous blind curves. It seems probable that a great improvement can be made in both the alignment and the grades, and that this part of the road will be improved through the co-operation of Great Barrington and the State.

Connecticut Valley Routes.

The main routes both east and west of the river from Springfield south to the Connecticut line, both in Agawam and Longmeadow, have been completed, and sections of the road have been resurfaced this year in Longmeadow, where the experimental concrete road was rough and uneven. The concrete was covered with a bituminous mixture 2 inches in thickness.

On the west side of the river the part of this highway which should be State highway was practically completed to Greenfield, with the exception of a gap about 2 miles in length in the city of Northampton.

An agreement was entered into between the Commission and the city of Northampton whereby the whole road was to be constructed, and the Commission was to pay for the cost of constructing about $1\frac{1}{3}$ miles of this road and the city of Northampton was to pay for the construction of about three-quarters of a mile. (The construction is well under way.)

On this same route in Deerfield an old State highway built of gravel, 15 feet wide, was widened to 18 feet, and resurfaced for $1\frac{1}{2}$ miles in length with a mixture made of hot gravel and an asphaltic product, thoroughly heated and mixed, about 2 inches thick after rolling. In some places a foundation of stone was necessary, as was also some additional drainage. This brought the cost of resurfacing up to over \$10,000.

There was a short gap at Cheapside bridge, just south of the village of Greenfield, and this was constructed of bituminous macadam 18 feet in width, trap rock being used.

North of Greenfield, on the line to Vermont and New Hampshire, the old State highway, from seven to twelve years old, was in poor condition and needed to be resurfaced. About 2 miles of this road was built of gravel, and this was resurfaced with gravel coated with light oil. The macadam section nearer the village where the traffic was heavier was resurfaced with trap rock grouted with a heavy asphaltic product.

The road in Bernardston, north of Greenfield, had been improved by the town and the State by work covering many years, money being obtained from the "small town" fund and the motor vehicle fees fund.

The road on the west side of the Connecticut from Bernardston north to the Vermont State line and so on to Brattleboro was in poor condition, except in a few places where the town and State had co-operated and improved short sections.

A contract was let and this road was constructed this year to the Vermont line. The section constructed was about $2\frac{3}{4}$ miles long, and it was built of gravel, 18 feet in width, well spread and rolled and coated with light oil.

There is a most excellent quality of gravel obtainable in Bernardston, and some of the best roads in the State have been built with it for a very moderate expense. The traffic, of course, is not very heavy, but consists of a few teams and trucks and large numbers of motor vehicles, so that a road of this character properly maintained will be serviceable for many years.

When the road in Northampton is completed, there will be a continuous route of improved highway from the New Hampshire line through Northfield and Bernardston to Greenfield, and from the Vermont line through Greenfield to Northampton, and on the west side of the river to Springfield and to the Connecticut line.

Connecticut Valley, East Side. — The route on the east side of the river from South Deerfield to Amherst has all been constructed, about 6 miles of it being State highway and about 3

miles having been improved under the "small town" act and with motor vehicle fees, the town contributing its share towards the expense. About 2 miles of the old State highway that was worn out between Hadley and Amherst has been resurfaced with bituminous macadam and widened to 18 feet.

The Commission in 1913 and 1914 used motor vehicle fees in constructing the road from Amherst south towards South Hadley, about 3 miles of road having been improved in Amherst, as well as a short section of road that was in the town of Granby. The town of Amherst has been co-operating with the Commission under the "small town" act for the past nine years, the town having appropriated over \$20,000 and the Commission having allotted an equal sum, making over \$40,000 that has been expended in constructing the road towards Sunderland, the road south towards South Hadley, and this year money was appropriated for the road leading to Pelham.

The route on the east side of the river runs through the Notch. This year a section of State highway was laid out upon this route, about $2\frac{1}{4}$ miles long, to extend southerly towards South Hadley from the southerly end of the gravel road built in 1914, and \$19,000 was allotted for the work.

A stone of most excellent quality was available on the roadside, so a water-bound macadam road, 15 feet in width with 3-foot shoulders of gravel, was constructed this year, and it is to be coated with light oil early in the spring.

From the Amherst line south through a corner of South Hadley, and on the edge of the town of Granby, the surveys have been made, and a State highway has been laid out and a contract let for the construction of about $2\frac{1}{4}$ miles of highway to connect with the State highway already built in South Hadley. This work is now under way, and when it is completed, the whole route from South Deerfield through Amherst and South Hadley will be completed.

Holyoke to Ware.

A State highway has already been constructed from Holyoke through Granby to the center of Belchertown, a distance of about $10\frac{1}{2}$ miles.

From Belchertown through Enfield to Ware, and from Ware

to Palmer, is covered by route No. 8 of chapter 221, western highways bill, and is mentioned more in detail in this report where the highways to be built in the five western counties are described.

Springfield to Worcester.

A section of bad road on this route has been improved in the village of West Brookfield last year and this, the Commission having allotted \$2,700 and the town having appropriated over \$4,000.

In Spencer the town and the Commission have been co-operating to secure a good road through the town, connecting the two sections of State highway.

The Commission allotted \$9,500 from the "small town" fund and from the motor vehicle fees, and the town appropriated a like sum, making \$19,000 to be used in constructing two sections on Main Street from the State highway westerly. A contract was let for this work and is nearly completed.

For a distance of 550 feet, where the grade was steep, a granite block pavement was used, and on the rest of the road, 4,750 feet in length, a bituminous macadam road was constructed.

Worcester to Boston.

This route was practically completed some years ago, but many miles of State highway are old and worn out, some of it being twenty years old and never having been resurfaced.

The whole road was only 15 feet in width, of macadam. The many corners and curves that were amply safe for the few horse-drawn vehicles that used the road are extremely dangerous now that 1,000 or more motor vehicles use the road in a day. The same remarks apply to most of the other main routes in the State.

The Commission has been resurfacing and widening the road as rapidly as it could with the funds available, and has been improving the corners and curves.

Last year and this year it has been resurfacing and widening the road in Shrewsbury leading into Worcester, where the city of Worcester is going to rebuild the bridge over Lake Quinsigamond. The hardened surface has been widened to 18 feet everywhere, and to 21 feet on the curves, all curves being banked.

A contract has been let for the resurfacing and widening of the road from Northborough to Shrewsbury, and the work is now under way.

On the Marlborough State highway there are some extremely dangerous curves, and the Commission has arranged with the county commissioners of Middlesex County to make the necessary taking of the land so that the Commission can widen the State highway, bank the curves, and secure a reasonably good view.

Just west of Marlborough where the State highway began, there was a right-angle corner with an intersecting street and car track, which would become extremely dangerous if a building were constructed on the corner.

The matter was taken up with the mayor and city council and the county commissioners, with the result that it was agreed that the county and city council would take the land necessary to prevent the view from being obscured, and that the Commission would lay out and construct a short section of State highway. This work will be done early next spring.

A contract has been let for the widening and resurfacing of the old State highway east of Marlborough, and the work is well under way.

On this section of the road there are two bad curves, and the Commission has arranged with the owner of the land to relocate a short section of the State highway so as practically to do away with both curves. This cut-off is now being built; while it involves considerable expense, the Commission believes it is well justified in doing the work, as there have been a great many bad accidents on this road.

The work in Northborough and Marlborough consists of putting in foundation where necessary, widening and banking curves, and putting on a top course of 3 inches of No. 1 broken stone, well rolled and grouted with a heavy asphaltic product. On the grades the stone will probably be grouted with a mixture of tar and sand to afford a better footing for horses.

Quite a few corners have been improved on this route, and the whole road in Weston and as far as Wayland has been widened and resurfaced during the last four years.

Greenfield and Fitchburg to Boston.

A short section of this road between Millers Falls and the State highway in Erving that was extremely bad has been surfaced with gravel and oiled with light oil this year. The whole route has been improved except on a few village roads.

In Greenfield over half a mile was resurfaced with trap rock grouted with tar.

In Gardner about three-quarters of a mile was resurfaced and widened to 18 feet with a bituminous macadam. The whole road has been constantly maintained.

The road from Fitchburg to Ayer via Lunenburg was constructed some years ago to the Shirley line.

The Commission let a contract in 1914 for the construction of a part of the road in Shirley, and that was completed last year, and the contract was extended to cover the whole length that remained to be built in Shirley, about $2\frac{3}{4}$ miles. This work was all completed and the road was opened for travel this fall.

A most excellent road was constructed similar in construction to some roads the Commission has built in the past in Sterling and elsewhere.

Gravel Asphalt Mixed Surfaces. — A road, 18 feet in width with 3-foot shoulders, was built everywhere, the curves being banked and widened to 21 feet. A gravel foundation was put in wherever the bottom was bad, and about 4 inches of local crushed stone was spread and well rolled.

On this was spread, as evenly as possible, about 3 inches of a bituminous mixture, made of gravel that had been run through the crusher and sand or stone dust, mixed with a heavy asphaltic product.

The gravel and sand and the asphalt were thoroughly heated and were mixed in a hot mixer, and then carted onto the road and spread. The surface was rolled down to about 2 inches in thickness, when the mixture was sufficiently cool not to crawl under the roller.

Great care is necessary to insure a uniform product, uniformly heated, mixed and spread, and that sufficient asphalt is used and no more than sufficient to bind the mixture properly.

The quantity of asphalt has to vary somewhat, according to

the amount of voids in the mineral aggregate. The variation is usually from 18 to 22 gallons of the hot asphalt to the cubic yard of gravel. When the mixture is right it has about the consistency of brown sugar, and compacts under the roller, though when it is first spread and rolled it sometimes has a few hair cracks which the traffic soon rolls out. The asphaltic product used in this work has a penetration of from 80 to 120 with a Dow penetrometer.

The road from Fitchburg to Ayer is now complete except a short section in the village which the town must construct, as is the road from Littleton to Concord and Lexington.

In Ayer there is quite a stretch of gravel road that was improved under the "small town" act that has been allowed to get into bad condition. It is hoped that this can be improved this year.

On the road between Concord and Boston, a section of State highway in Lincoln built in 1895 has been widened to 18 feet and resurfaced this year. A foundation had to be put in for the whole distance as the bottom was soft and the road rutted badly every spring.

Fitchburg and Worcester to Providence.

The Commission has been working on this route for several years. This year about one-half a mile of State highway was built in Leominster, including a small reinforced concrete bridge; this was an extension of the Leominster State highway.

Last year and the year before a State highway was built on this route in Sterling, the town co-operating by building a bituminous macadam road through the village.

The Commission this year built a short section of State highway easterly from Sterling to connect with the State highway to Lancaster and Clinton.

The work was continued this year on the line to Worcester in West Boylston, about 2 miles of road, 18 feet in width, being constructed. The town appropriated \$4,000 for a part of this work in order to get the Commission to extend the State highway from the railroad underpass southerly to connect with the existing State highway.

The construction in West Boylston, Leominster and Sterling

was a hot gravel asphalt mixture similar to the work described in Shirley on the Fitchburg-Boston road.

This completes the route between Fitchburg and Worcester, so far as State highway construction is concerned.

Worcester to Providence.

This is also a route on which the Commission has been working for many years.

In Grafton the State highway was completed to within about three-quarters of a mile of the Northbridge line. This section was laid out and constructed this year of tar-macadam, 18 feet in width.

In Northbridge a State highway was built in 1913 from the Grafton line southerly, the town appropriating \$4,000 and building a section of road through the village of Rockdale.

In 1914 the Commission laid out a State highway south of the village, the town appropriating the same amount, \$4,000, and completing the work on the village street.

The State highway built in 1914 in Northbridge was a road of gravel concrete, 18 feet in width, with crown $\frac{1}{4}$ inch to the foot, 6 inches thick at the sides and $8\frac{1}{4}$ inches thick in the center.

This year's State highway was an extension of last year's concrete road, over three-quarters of a mile of concrete road being built at a cost of \$18,000. There was considerable grading and a good deal of bad bottom on this section of the road. The town of Northbridge appropriated \$4,000 towards the cost of this work.

If the town of Northbridge continues to co-operate, the Commission expects to continue this work until the road is completed.

In Uxbridge the Commission has already built some State highway, and it has helped the town under the "small town" act and with motor vehicle fees fund.

The road through the village is in bad condition, and the road south of the village that has been improved under the "small town" act has got into bad condition because it has been neglected and has not been properly maintained.

The Commission offered to help the town improve these

roads but the town did not see fit to co-operate, so no improvement was made. On a route of this kind where so many miles must be built, the only way the roads can be improved within a reasonable number of years is by co-operation between the towns, counties and the State.

In Blackstone the road is now completed to the Rhode Island line, the town having co-operated with the State in constructing the highway and a concrete bridge.

Worcester to Southbridge.

A section of State highway was built this year on this line in the town of Charlton, about a mile in length, to the Southbridge line. To complete the line about a mile of road should be built in Charlton village, and about a mile and a quarter in North Oxford. It is possible, if the towns and county co-operate, that these two sections can be completed.

Worcester to Douglas via Sutton.

The Commission and the town of Sutton have been co-operating for the past four years, each appropriating \$5,000, making \$10,000 a year in all. A water-bound macadam road has been built that will undoubtedly have to be oiled with light oil. This year the work was continued, the town and the Commission each appropriating \$5,000. The Commission has been allotting money from the motor vehicle fees fund.

A section of the road that was built was upon a new location, as it was found that by relocating the highway two bad corners could be eliminated and the grade on a hill could be materially improved. It is hoped that this route can be completed in co-operation with the town possibly next year.

Fitchburg to Keene, N. H., via Winchendon.

This route has been completed this year. As was stated in last year's report, the road from West Fitchburg towards Keene, N. H., via Winchendon, Mass., and FitzWilliam, N. H., was selected as the main route because the grades were much better than those on any other route, and the road could be constructed for a relatively small amount of money because the route went through a locality where gravel could be obtained.

The county of Worcester contributed towards the cost of constructing the road in the town of Westminster. There were about $7\frac{1}{2}$ miles of road in Westminster and Ashburnham, short sections of which had been improved in Ashburnham under the "small town" act.

In Winchendon there were about 6 miles of road on this route, not including the road through the village.

The town of Winchendon has paid one-half the cost of constructing the road in that town. In 1913 the town and the Commission each appropriated \$5,000, making \$10,000 in all that was expended in constructing the road towards Ashburnham.

In 1914 and 1915 the town and the Commission each appropriated \$2,500, or \$10,000 in all that was used in constructing the road beyond Winchendon to the New Hampshire State line.

This year this section was completed, 8,600 feet of gravel road being constructed to fill in the gap between Winchendon village and the road built in 1914 from the New Hampshire line towards the village.

This whole road, about 15 miles in length from the Fitchburg line to the New Hampshire State line, has been built of gravel, on a foundation where necessary. It was oiled with light oil this year for its entire length, this treatment being absolutely necessary because of the great increase in the number of motor vehicles using the road.

The city of Fitchburg has co-operated by improving the road in West Fitchburg.

Other Routes in this Neighborhood.

The Commission in co-operation with the county of Worcester and the towns has been improving various other roads in this vicinity under the "small town" act and with motor vehicle fees. One and three-quarters miles of improved gravel road has been built on the road from Sheldon bridge in Ashby to Mason City, N. H. Between Templeton and East Templeton about $1\frac{1}{2}$ miles of gravel road, 18 feet in width, has been constructed.

Routes around Boston.

The Commission completed the construction this year of a section of State highway on Middlesex Avenue, Somerville, on the main traffic road from Malden and Melrose into Boston. This section of road was used by a large number of market teams and was in extremely bad condition. The city of Somerville put in the necessary surface drainage and appropriated \$3,500 to pay for the grading.

A Portland cement concrete road, 2,200 feet long and 24 feet in width, was constructed. It was 6 inches thick on the sides, and had a quarter inch crown, making it 9 inches thick in the center. The road cost \$16,000, including the city's contribution.

The road was built of concrete because it seemed the best material to put upon that bad bottom. It was laid sufficiently below the grade of the curb to enable the Commission to cover it with 2 inches of some bituminous pavement whenever the surface of the concrete was sufficiently worn to make such a covering desirable.

Middlesex Avenue diverges from the main State highway to Medford in Somerville and Medford. This State highway was originally constructed of water-bound macadam, but the traffic over it was so great that it wore out rapidly and was never in good condition, although it was kept constantly patched and the holes and depressions were filled with broken stone. Surface coatings of tar and oil covered with peastone had been used with very indifferent results. The Medford end of this road was resurfaced prior to this year.

This year the rest of the road was resurfaced, the subgrade being carefully prepared, the old road being scarified, and enough new broken stone added to make a solid base when thoroughly rolled. On this was spread an asphalt pavement, of the type known as Topeka mix, 2 inches thick after rolling. Great care was taken to obtain the best quality of asphalt and the best mixture possible.

The Commission and its engineers, on account of the traffic's being so heavy, would have preferred to build (this is true also of a road that was resurfaced in Revere on the main line to

Lynn) of granite block on a concrete base, but it was impossible to secure enough money for this from the funds available for resurfacing without letting a good many miles of other roads on main lines go to pieces. It is hoped that this resurfacing will carry the traffic for a reasonable number of years, without too great a cost for maintenance.

Boston to Lowell via Billerica.

Nearly 12 miles of State highway have already been constructed on this route in Winchester, Burlington and Billerica. About 3 miles more road have been constructed in Billerica under the "small town" act or with motor vehicle fees. On the first sections built, the town and the Commission divided the expense, but for the past two or three years the county of Middlesex has paid one-third of the cost of construction.

The county of Middlesex, the town of Billerica and the Commission this year each appropriated \$2,500, or \$7,500 in all, the money being used in constructing a new concrete bridge over the Shawsheen River and in building the approaches to the bridge of tar-macadam.

The city of Lowell had constructed a good pavement to the Chelmsford line on this route. The road in Chelmsford was in extremely bad condition, and the highway location was not wide enough to accommodate suitably the car tracks and still have room for a highway of proper width to be constructed, to say nothing of the possibility of a sidewalk being needed.

The Commission offered to construct a State highway 18 feet in width if the county and the town would obtain the necessary width and would pay all land and grade damages and for the necessary drainage rights. Hearings were held, and the county commissioners made the necessary layout.

A concrete road was constructed 18 feet in width with 3-foot shoulders on each side. The road itself is completed and open to travel.

If the county and the town continue to co-operate with the Commission in constructing this road, it will be completed in about two more years.

Boston to Lowell via Woburn and Tewksbury.

This main line is practically completed so far as State highway is concerned.

The Lowell end of the State highway in Tewksbury is from ten to fifteen years old, and is badly in need of resurfacing. The surface has been oiled with a hot asphaltic oil, but has required constant patching. This road, like many others on the main lines, is practically worn out, but cannot be resurfaced until there is money available.

The city of Woburn with the assistance of the county has improved a portion of the road this year.

Boston to Lawrence.

The construction on this route is practically completed, but many miles of the older State highways, built twelve or fifteen years ago of water-bound macadam, 15 feet in width, need resurfacing and widening.

The State highway in Stoneham and Reading on this route was widened and resurfaced last year.

This year about a mile and a half of highway northerly from Reading Center was widened to 18 feet and resurfaced, the curves being banked, and about a mile in Andover was widened and resurfaced, beginning one-half mile northerly from the North Andover line. The cost in Reading was \$15,780, and in Andover was \$10,300.

The Reading road was built in 1903, and the Andover section in 1898; both were water-bound macadam roads 15 feet in width. On both sections the work consisted of putting in a foundation where necessary, preparing the base and widening it with broken stone to 18 feet everywhere and 21 feet wide on the curves. At the same time the crown was reduced to about 1 inch to each yard in width.

The surface on both sections was made of a bituminous concrete composed of crushed gravel and broken stone, heated and mixed with a hot asphaltic product. This work was similar to the work done in Shirley described in this year's report under the Boston and Fitchburg route.

A short section of State highway was laid out in Reading

south of the village to connect with the State highway already built. The town had built a macadam road in this section and it was quite rough and more or less worn out, and this piece of road was widened and surfaced in the same manner as the sections above described.

Boston to Newburyport via the Turnpike.

The work on this road has been continuous for the last five years. The road has been widened gradually from year to year to 18 feet at least, and a gravel road has been built in eight different towns from the Melrose line to the Newburyport line, a distance of about 26 miles. The road has been constantly maintained by section gangs, who shaped it every week and after heavy rains, meantime keeping the road constantly patched.

The Commission has been allotting money from the motor vehicle fees each year, and most of the towns on the route have contributed to build and maintain the road.

The traffic over it has increased so fast that a gravel road could not be maintained in good condition even if it were constantly shaped and patched. Last year the road had to be oiled for half its length, and this year the sections oiled were reoiled and all the balance of the road received one coat of light oil. The average traffic on this turnpike was about 600 vehicles a day in August this year, and over 800 in October, the teams numbering from 30 to 45 a day on the average.

This year the Commission has allotted over \$9,000 on this road, and the towns appropriated about \$2,500. The maintenance in the future, now that the road is oiled, will largely consist of reoiling and then in keeping the oiled surface constantly patched rather than by shaping with a log-drag or road scraper as has been done in the past.

The team traffic in Saugus and a part of Lynnfield on this road is so heavy that it is badly rutted every spring, and it takes a month or two to get the road into proper shape. This part of the road ought to be constructed of some better material than gravel.

Some of the towns on this route have co-operated each year, appropriating money to keep the road in order. This year

Danvers spent \$735, Topsfield \$500, Ipswich \$467 and Newbury \$750, while other towns like Saugus, Lynnfield, Rowley and Peabody refused to co-operate.

If this much-used road is to be maintained in the future, each town must do its share or the county must help, because it is not fair to other localities in the State to have so much money from the motor vehicle fees spent on this one route now that it has been once improved.

Boston to Salem via the Floating Bridge.

This old turnpike in Salem is the shortest road to Lynn and Boston. It was practically abandoned some years ago because it was so hilly, and a new road with better grades had been built between Salem and Lynn via Forest River.

With the advent of motor vehicle traffic this road, like the Newburyport turnpike, became important once more. The motorist is no longer deterred by hills.

The Commission has State highway on this route, between Boston and Lynn, over the marshes in Revere and Saugus.

A part of the highway in Revere was resurfaced this year with a surface of an asphaltic concrete, or substantially what is known as Topeka mix.

The city of Lynn has been paving the street in Lynn every year for the past few years, and has an improved road completed to within less than half a mile of the Floating bridge. Last year the Commission laid out and constructed a section of State highway on this route in Salem from the Lynn line northerly. This year the work was completed to the point where the city of Salem agreed to meet it with an improved road.

A bituminous macadam road was constructed nearly 2 miles long and $19\frac{1}{2}$ feet in width. The subsoil was extremely wet and clayey so that a foundation was necessary, which made the work expensive, the cost being about \$45,000. The top surface of this road was made of No. 1 stone, thoroughly rolled and grouted, with a hot asphaltic product sprayed in under pressure, with smaller stone rolled in to fill the voids and with a surface coat of asphalt sprayed on and covered with peastone and sand.

Boston to Newburyport via Lynn, Salem, Beverly and Ipswich.

This is the main shore route not only to the whole North Shore but to points in New Hampshire and Maine.

The so-called "Revere traffic road" begins at Revere Street in Revere and runs over the marshes, crossing the railroad near the Point of Pines station; here the route runs over the metropolitan parkway to the Saugus River.

The Revere traffic road was laid out and constructed by the Commission under the authority of several special acts of the Legislature. It was practically completed late in the season in 1914, as set forth in last year's report. The Legislature appropriated \$300,000 to pay all land damages and for the construction of the highway. Of this amount, only \$281,508.24 has been expended.

Beyond the Saugus River there is a section of State highway. The State highway beyond in Swampscott and Salem was badly worn out because of the extremely heavy traffic. This highway was built of macadam and had been oiled with hot oil, but the traffic was so heavy that in spite of daily patching the road was rough and more or less rutted in the oiled surface. The cost of maintenance was extremely high.

This year the whole road in Swampscott and Salem has been widened and resurfaced for a length of about $3\frac{3}{4}$ miles, the curves being widened and banked.

A short section of road in North Beverly that was in poor condition was lightly resurfaced with a small quantity of stone grouted with tar. The rest of the State highway in North Beverly as far as the ice houses was resurfaced in 1913 and 1914.

From here on through Wenham, Hamilton, Ipswich, Rowley and Newbury to Newburyport the road has been maintained in very fair condition by oiling and constant patching, except for a section in Ipswich that was constructed some years ago of gravel and oil by the layer method then in use. The road had become quite rough and somewhat rutted as had the gravel road beyond, which had only had a surface coat of oil. This road was picked up with picks in the roller, the surface broken up and the crown reduced, and broken stone was added and

thoroughly flushed and rolled, the road being widened to 18 feet everywhere with 21 or more feet on the curves, all curves being banked. When this was completed, the road was oiled with a light oil covered with peastone and sand.

The gravel road beyond Rowley was reshaped and widened and the crown was reduced, the road being oiled with a light oil properly covered.

All of this work was paid for out of the general maintenance fund.

The State highway beyond Newburyport in Salisbury to the New Hampshire line has been kept constantly patched and maintained. On this route, as on many others, the Commission has been using its maintenance gangs when it could in building up the shoulders of the road so as to diminish the crown; where the money was available, broken stone was rolled in and the shoulders were oiled. Where no money could be spared, the shoulders were widened by a road machine. This most valuable work will be continued as fast as the money is available.

Routes to Gloucester and Cape Ann.

This route leaves the main line at Beverly and goes through Manchester to Gloucester and so on to Rockport. From Gloucester there is a route back through Essex to Ipswich, where it joins the main road to Newburyport. A very large number of touring automobilists go over this route, as the scenery on the North Shore is famous all over the country.

A short section of the State highway in Beverly was lightly resurfaced this year.

The town of Manchester spent over \$36,000 in rebuilding the town road on this main route from the Gloucester line to the village. The work was done under specifications drawn by the Commission and under the supervision of its engineers, and a most excellent road was obtained.

Next year the town will probably construct the Beverly end of the road in the same manner. The town paid the entire cost of constructing this road, the Commission merely furnishing advice and supervision.

The State highway in Gloucester was built between the years 1895 and 1898. The section towards Gloucester was resurfaced

some years ago and is in excellent condition. The Manchester end of the road has been maintained with a blanket coating of hot oil and constant patching, but it is worn out and needs resurfacing badly. The State highway beyond Gloucester on the road to Rockport has been maintained by the use of light oils and constant patching.

Gloucester to Ipswich via Essex.

The Commission has been at work on this road for several years because there is a good deal of local traffic between Essex and Gloucester, and a great deal of automobile traffic in the summer season both between Gloucester and Essex and also to Ipswich.

The town of Essex and the Commission have co-operated under the "small town" act in improving the road in Essex to the Ipswich line. Gravel has been used and the road has been oiled with light oil. The traffic was so heavy that this treatment was not very satisfactory, and it is evident that sometime in the near future a stronger road must be constructed.

The Commission has already constructed a State highway on this route in Essex from the Gloucester line back to the village of Essex.

For several years the Commission had told the mayor and city council of Gloucester that it was willing to continue the work on the Essex end of this road in Gloucester if the city would pay all land and grade damages and would also construct at the city's expense a section of the road on the end nearest the city. Last year the city agreed to do this, and it constructed about three-quarters of a mile of road on this route.

The Commission laid out a State highway about 1 mile long, beginning at the Essex line and running towards Gloucester. The old road was narrow, the grades and curves were extremely bad, and the whole road had to be widened, and in one place it had to be constructed on a new location. The grading was extensive and expensive, and there was a good deal of ledge that had to be excavated. The street railway company co-operated by moving its tracks and paying for its share of the grading and excavation.

The road was built $19\frac{1}{2}$ feet wide, with adequate shoulders

on each side, the surface being of crushed gravel and an asphaltic mixture on a 4-inch broken stone base, wherever the grades did not exceed 4 per cent. On the steeper grades the road was constructed of broken stone well rolled and grouted with a mixture of hot tar and hot sand, in order to make them as little slippery as possible. This section of road cost \$22,000 because of the expensive grading and ledge excavation.

The city of Gloucester has agreed to continue its construction on the Gloucester end of this road, and the Commission has laid out a section of State highway from the end of this year's work towards Gloucester. A contract has been let, and the work has been started. The city of Gloucester has agreed to assume and pay all land and grade damages.

The grades on this section now under construction are quite bad and very extensive widenings will be necessary, as will a large amount of ledge excavation. In many places the street railway track will have to be moved before the highway can be constructed.

The understanding with the city of Gloucester is that if the Commission will lay out and construct at some time a State highway extending from the Essex line as far as the junction with Magnolia Avenue, the city of Gloucester will at its own expense construct such portions of the balance of the road as are not now in good condition, and that the city will thereafter maintain all the road beyond Magnolia Avenue, keeping it at all times in good condition. Most of this road has already been constructed by the city, and is now a macadam road coated with oil.

Salem to Lawrence via Middleton.

Concrete Road. — The Commission has been constructing a cement concrete road in North Andover on this route, which is quite fully described in last year's report on pages 24 to 27.

Further observation of the longitudinal cracks, which were therein described, seems to indicate that they will not prove to be a serious defect so far as the use of the road is concerned, if we continue to keep them properly filled with some bituminous mixture.

Over 3 miles of concrete road have been built, and the Commission had some small brass plugs set in the concrete on each

edge of the roadway, opposite the stone bounds, and observations were made from time to time to ascertain the amount of longitudinal expansion. There was considerable expansion at various points on the road, the maximum being about 1 inch in 1,000 feet of the concrete road. The longitudinal cracks that appeared seemed to be due to settlements on new embankments and fills.

The work was continued this year, about 1 mile more of cement concrete road being constructed, 18 feet in width, at a cost of \$14,300.

About 1 mile of poor road remains to be built in North Andover to the Middleton line.

The road in Middleton is State highway from the North Andover line to the village. The village square was improved last year and this, the Commission, the county and the town each paying part of the expense.

The road beyond in Middleton has been improved at the joint expense of the Commission and the town under the "small town" act, the work having covered several years.

This road is now quite old and a good deal worn, so that when the traffic increases, as it will when the route is completed, it will require resurfacing and widening.

A State highway about 4,000 feet in length was laid out and constructed in Danvers this year at a cost of \$10,000. This road was constructed of broken stone, well rolled and grouted with an asphaltic product, and was 18 feet in width with 3-foot shoulders on each side.

Lowell to Lawrence, Haverhill and the Beaches.

The possibility of the construction of a new road in the city of Lowell, to connect with the so-called River Road running to Lawrence, will be the subject of a special report by this Commission to the Legislature.

There are about 2 miles of old road in Methuen that is narrow and in poor condition, connecting the River Road that was constructed in Dracut and Methuen with the new stretch of road that the county commissioners of Essex County have laid out and constructed under the authority of chapter 591 of the Acts of 1912.

The town of Methuen and the Commission each appropriated some money for the temporary repairs necessary on this road and to oil it, as it was the only poor piece of road on this route. Surveys have been made, and the matter has been taken up with the county and the town to see if the necessary width can be secured so that a modern highway of suitable width can be constructed.

The highway that was laid out and graded by the Essex county commissioners, under the authority of the above statute, is almost entirely over a new location along the Merrimac River, and it connects near the pumping station in Lawrence with a paved city street. It is about 2 miles long and was graded with gravel.

By the terms of the act, after the work was completed by the county commissioners, the Commission was to take it over as a State highway. There was an understanding between the county commissioners and this Commission that after the road was properly constructed, of sufficient width, etc., that it should be surfaced by this Commission. The whole 2 miles has been completed and opened to travel.

The road was constructed 18 feet in width with a 3-foot gravel shoulder on each side, the base being made of a sufficient thickness of broken stone thoroughly rolled, and the surface being made of No. 1 stone, grouted with an asphaltic product.

On the hill leading down to the pumping station in Lawrence, a section of macadam road was constructed and it was oiled. The Commission allotted \$27,000 for the work. This construction was adopted because the Commission believed that the street railway company, which has by agreement with the county a double car track location on the side of this road for almost its entire length, having paid its share of the expense, would soon desire to build a double car track on the road down the hill.

When this is to be built the Commission believes the whole width of the street from curb to curb should be paved with granite blocks, and that the railway company should pay for the paving between its tracks and 18 inches on each side.

The State highways beyond Lawrence in Methuen, Haverhill, Merrimac, Amesbury and Salisbury have been kept constantly oiled, patched, and maintained by the maintenance gangs.

Except for a short stretch of granite block pavement constructed in Lawrence last year, most of this road as far as Salisbury Square is old water-bound macadam maintained by oiling and constant patching. Quite a number of miles should be widened and resurfaced.

Salisbury Beach Road.

The road back of Salisbury Beach, leading northerly to the New Hampshire line, was constructed by the Commission in 1912 under authority of a special act of the Legislature. There was only money enough available to enable the Commission to build a narrow gravel road.

The Commission has allotted money from the motor vehicle fees to oil and patch this road for the last three years, and it has been maintained in fair condition, but it is evident that the road should be widened and that the whole surface should be constructed of some suitable material. Probably a gravel-asphaltic mixture could be used to advantage.

Boston to Providence.

On this route a section of State highway was laid out and constructed in Dedham on Bridge and Ames streets, the road being completed late in the fall of last year.

The town of Dedham agreed that if this highway were built, it would widen the highway about one-half a mile in length beyond, and construct a good road.

At the request of the town the Commission made surveys and a plan for a layout 50 feet in width from the bridge over the Charles River to a curve on the road (here the location was to be from 50 to 65 feet), and beyond this curve the location was to be 60 feet in width to the main street near the court house.

The town petitioned the county commissioners, who have held the necessary hearings, and it is probable that the layout will be made very soon and the town will be directed to construct the road.

The Commission laid out a short section of State highway beyond the village to connect with the State highway already built on the main road to Providence. This short section of road is being constructed by the town under a contract with

the Commission, and a macadam road, 18 to 20 feet in width, is being constructed, the top surface being grouted with asphalt. It will be completed early in the spring.

On this main route to Providence there is so much traffic now that the old State highways, which were built only 15 feet wide and of macadam, are not wide enough. The old roads also had too much crown, and many complaints have been made of their being slippery for horses.

The whole road, for its entire length where it was not constructed or resurfaced with some form of bituminous macadam, had to be coated with tar or oil, or it would soon have become impassable.

The Commission has been widening and resurfacing the road and reducing the crown as rapidly as it could with the money available, the worst sections being done first. Sections of the road were widened to 18 feet.

A short section was resurfaced in Norwood at a cost of about \$2,400.

In Walpole nearly $3\frac{1}{2}$ miles were widened, and the crown was reduced. Tar, oil or asphalt was used to correspond with the materials with which the road was constructed. In some places the road was only widened on the side, the shoulders being built up to reduce the crown. A part of the way the whole road had to be widened and resurfaced. Over \$14,000 was spent on this work in Walpole.

In Norfolk over 2,000 feet was widened and resurfaced, and over a mile was widened and the crown reduced, at a cost of over \$7,500.

In Wrentham about seven-eighths of a mile was widened and resurfaced, about \$7,300 being expended.

Boston to Cape Cod via Randolph, Brockton and Middleborough.

In Randolph, on the main road from Boston to Brockton, the Commission agreed to construct a State highway from the Avon line towards the village if the county or the town would widen the highway sufficiently to provide room for the car tracks, the highway and a sidewalk where necessary. The commissioners of Norfolk County agreed to make the layout and to pay all land and grade damages.

The car tracks were to be relocated on the side, the street railway company paying for moving its tracks and for all the additional grading that was necessary for their use.

A cement concrete road nearly 2 miles long and 18 feet in width was constructed, 6 inches thick on the sides and $8\frac{1}{4}$ inches in the center. The usual joints were put in. In this road, as well as in several other concrete roads built last year and this, about 8 per cent. of hydrated lime was used to make a denser mixture and thus prevent some of the expansion caused by the moisture. This highway cost about \$25,000 to construct.

Avon.

In Avon, on this same route to Brockton, a State highway was laid out last year from the square to the Brockton line and was graded and partly constructed. The construction was completed this year, an asphaltic macadam road 18 feet in width being built. The town appropriated \$6,000 and the Commission allotted \$11,000 for this work.

Bourne.

In Bourne on the north side of the canal the State highway has been completed from Buzzards Bay to the bridge over the canal at Sagamore.

Over a mile of State highway was built to fill in the gap between the State highway constructed last year and the bridge, at a cost of over \$11,000. The road was constructed of local broken stone, grouted with tar, with a sealing coat of tar on the hills and of heavy oil on the level road.

Wellfleet-Truro.

In Wellfleet there were nearly 3 miles and in Truro there were nearly 5 miles that had been improved from year to year as a sand and asphaltic oil road, with money made available from the motor vehicle fees fund, that had never been laid out as State highway.

In many places the location was too narrow and the curves were extremely bad. The Commission took up the matter of widening with the Barnstable County commissioners and

the selectmen of both towns, the Commission agreeing to lay out these roads as State highway if the county or town would make the necessary takings and would pay all land and grade damages. Plans were prepared for the purpose, and the necessary layouts were made.

A State highway has been laid out in both towns, nearly 8 miles in all.

In Wellfleet over \$15,000 has been expended in widening the road, improving the corners and curves and preparing the base so that a sand and oil surface can be put on in the spring. The road was widened to 18 feet and will be somewhat wider on the curves.

In Truro the layout has only just been made so that no work could be done this fall, but the road will be widened and improved as early as possible next year.

The old State highway in Truro has been widened and the alignment of the surface has been straightened, the road surface being widened and the corners improved, thereby much improving the view. Over \$8,000 was spent on this work. In one place the alignment was so changed that it practically eliminated a bad reverse curve.

Now that there is an improved highway from Boston to Provincetown, both via Plymouth and via Middleborough, so many automobiles are using this road that the old highway 12 feet in width, with extremely bad curves, was entirely inadequate and extremely dangerous.

The Beach Point Road in Truro, along the beach to the Provincetown line, has been kept constantly patched and in good condition with the \$500 appropriated yearly for the maintenance of that road.

On this route over $5\frac{1}{2}$ miles of road have been resurfaced this year, the road surface being widened to 18 feet everywhere, with 21 feet on the curves, the curves being banked. Nearly \$31,000 was expended in this work.

Over 3 miles of State highway in Chatham and about $1\frac{1}{2}$ miles in Orleans have been widened from 12 and 15 feet to 18 feet, and the corners and curves have been improved.

Boston to Cape Cod via Plymouth and Sagamore.

This route was practically completed last year when the sand and oil road was finished in Bourne, connecting with the approach to the new bridge over the canal at Sagamore. This route connects at this point with the State highway built this year on the north side of the canal running to Boston via Middleborough. There is now a large traffic over many portions of this road, and a great many motors use it for its whole length.

The Commission has done as much as it could with the money available to improve this road. It has been resurfaced and widened in some of the worst places in Weymouth, Hingham, Cohasset, Scituate, Marshfield, Duxbury and Plymouth. Over 5 miles of the State highways have been resurfaced and widened, and over \$33,000 has been expended on this work this year in these towns. In some places the corners and curves only were improved.

The improvements have consisted of widening to 18 feet everywhere, reducing the crown, and banking the curves where possible, all curves being widened to 21 feet. This has been a great improvement, but much should be done on this route, as well as on all the other main routes in the State.

The Commission intends to construct a short section of State highway in Hingham and Cohasset to fill in a gap that was omitted because of a railroad crossing.

In the town of Plymouth the Commission and the town have under consideration the widening and construction of the highway leading from the village southerly to connect with the State highway, the Commission having agreed to construct a modern highway, 18 feet or more in width, with the necessary gutters and shoulders, if the town would take the necessary land to widen the road, arrange to have the car tracks moved where necessary, and would pay all land and grade damages and do whatever grading and construction was necessary for sidewalks, etc. The plans for this improvement have been made and sent to the town, but so far the town has failed to appropriate the necessary money. It is hoped this road can be constructed next year.

Boston to Plymouth via Hanover Four Corners and Queen Ann's Corner.

This is the old turnpike route to Plymouth, and the Commission has been working on it for several years in co-operation with the towns through which it runs.

In Weymouth there are about $2\frac{1}{4}$ miles of road on this route, and that road was in bad condition. The matter was taken up with the town, and the Norfolk County commissioners, and it was agreed that the State, the county and the town should each pay one-third of the cost of construction, each appropriating \$5,000, making \$15,000 available. The county also agreed to make the necessary layout, to widen the location where necessary and to pay all land and grade damages.

They also requested the Commission to rebuild two culverts or small bridges that were too narrow and were not in good condition, the understanding being that if the total cost including these culverts exceeded \$17,000, the town and county would each pay one-third of the cost of building these two bridges. The county has already agreed to do this.

The whole road in Weymouth from the existing State highway to the Hingham line has been laid out. The road is being built of local stone macadam grouted with an asphaltic product. The surface is to be 18 feet in width, the usual shoulders and gutters being built. On a portion of the road a stone foundation was necessary. About one-half of the whole length has been completed, and much of the grading and excavation has been done on the balance of the road, \$11,500 having been expended. This road will be completed and open to traffic early next year.

In Hingham nothing has been done as yet, but the Commission hopes the town will join the other towns in co-operating to improve the road.

In Norwell the whole road has been improved in the past under the "small town" act at the joint expense of the town and State.

In Hanover there is a small section of State highway on this route, and the Commission hopes the town will agree to co-operate in improving the balance of the road.

In Pembroke a considerable portion of the road had been improved at the joint expense of the town and State. The Commission agreed this year that if the town would appropriate \$9,000, which was one-third of the estimated cost of constructing the balance of the road in Pembroke, the Commission would allot \$18,000 and would lay out the whole road as State highway, including the 1913 and 1914 sections improved under the "small town" act. The town appropriated the money, and the State highway was laid out.

There are in all nearly 4 miles of road, of which about $1\frac{1}{4}$ miles had been improved, and $2\frac{3}{4}$ miles remained to be constructed. A contract was let and the road has been constructed. The road was built of local stone, 18 feet in width, grouted with an asphaltic product, with the usual shoulders, gutters, etc. For a portion of the way a stone foundation was put in. About \$28,500 was expended on this work.

In Duxbury the town and the Commission had each appropriated \$10,000, making \$20,000 available for the construction of about 2 miles of road beginning at the Pembroke line and running southerly. The work was started but not completed last year, $1\frac{1}{4}$ miles being completed this year.

About two more miles of road remained to be built in Duxbury to reach the Kingston line. The Commission agreed to lay this out and construct it as State highway if the town would appropriate one-third of the estimated cost. The town appropriated \$6,666, and the Commission allotted \$13,500 for the work. The layout was made and the work is practically completed.

The width of the surface was 18 feet, and nearly a mile was built of broken stone penetrated with tar. On the rest of the road there was no stone or gravel available, so that a little over a mile of road was built of sand and asphaltic oil by the mixing method.

There is about three-quarters of a mile of road in Kingston that must be constructed to complete this route and connect with the State highway to Plymouth, and the Commission is ready to co-operate with the town and county in constructing this piece of road, as well as the stretches that remain to be constructed in Hingham and Hanover.

The State has not nearly money enough available to complete all the many desirable routes as State highways within a reasonable number of years, unless the towns and counties assist in providing funds; where they do, the routes will soon be completed.

Boston to Middleborough via Whitman.

This secondary route through Quincy, Weymouth, Abington, Whitman and East Bridgewater and so on to the Cape is one that the Commission and the towns have been co-operating in constructing for several years. It is now practically completed as an improved road, though portions of it need widening and resurfacing. This route to Middleborough is somewhat shorter than the route via Brockton, and it avoids that city and the thickly settled portions of many of the villages.

In Abington this year the work has gone on under an agreement between the Commission and the town that the town should build the sections of the road in the village and the State the sections outside.

A State highway was laid out from the Whitman line northerly to the beginning of the village, something over half a mile. The road was constructed of local stone, 18 feet in width, grouted with tar. A stone foundation was necessary for most of the distance. The cost was \$6,870 including all work, of which amount the surface cost about \$4,200.

The town of Abington constructed the section of road through the village connecting this new State highway with the State highway built in 1913. This completes the road in Abington.

In Whitman the whole road has been completed at the expense of the town and the State, about \$1,000 having been expended this year to complete the State highway laid out last year.

In East Bridgewater the Commission helped the town to improve the road in 1913 under the "small town" act and with motor vehicle fees fund.

Boston to Fall River via Stoughton and Taunton.

This route is the most direct route to Taunton and Fall River, and is very much used by motor vehicles.

In Raynham about $1\frac{1}{2}$ miles of road were laid out and con-

structed as State highway, the Commission having agreed to construct this road if the town would appropriate \$2,500 towards its cost and would pay all land damages. The old road had been improved a good many years ago under the "small town" act, but it needed widening and resurfacing.

The section laid out filled in the gap between a State highway already constructed and the Taunton line. A tar-macadam road, 18 feet in width, was constructed, with the usual gutters and shoulders, at an expense of \$10,685.

This whole route has now been improved, either as State highway or by the towns and State jointly, except in the city and village sections which have been improved by the municipalities.

The older sections of State highway had too much crown, were worn out in many places and needed widening and resurfacing. The same character of work has been done on this road as was done on the other main roads; parts of it were widened, the crown was reduced, the curves banked, and the view improved where possible, and the road was resurfaced with some form of bituminous macadam. Work of this character was done in Canton, Taunton, Dighton and Somerset, about 3 miles of road being widened and resurfaced at a cost of about \$23,000.

Boston and Brockton via Braintree and Holbrook.

While the main road to Brockton runs through Randolph and Avon, there are several other roads the importance of which has been brought to the attention of the Commission from time to time during the past few years. This is particularly true of the road through Braintree and Holbrook.

In Braintree the Commission agreed to construct a section of State highway from the Holbrook line northerly towards Braintree if the town would appropriate \$5,000 towards a total estimated cost of \$15,000. The town appropriated \$5,000, and the Commission allotted \$10,000, making \$15,000 available. The county commissioners of Norfolk County made all the necessary land takings to secure a good alignment and proper width.

A contract was let for the construction of over a mile and a quarter of road, and the work is well under way, \$11,000 having

been expended. The road is being built of macadam, 18 feet in width, grouted with an asphaltic product, with the usual shoulders and gutters. It will be completed in the spring.

Brockton-Stoughton.

In Stoughton the town and the Commission have been co-operating for several years in constructing the road to Brockton, the Commission paying two-thirds of the cost and the town one-third. This year the work was completed, the town appropriating \$4,000 and the Commission allotting \$8,000, making \$12,000 available. The work was done by the town.

A local broken stone road was built, 18 feet in width, grouted with tar. For a portion of the way a stone foundation had to be put in. The road cost a few dollars more than the \$12,000 appropriated.

In connection with this work the town itself constructed the approaches to the village square, thus completing a good road to Brockton.

Several of the older State highways around Brockton were widened and resurfaced this year. Over $1\frac{1}{2}$ miles were widened and resurfaced in Brockton on the road towards Easton, and about 3,500 feet was widened and resurfaced in Brockton on the road towards Abington.

Other Roads on the Cape widened or resurfaced.

In Falmouth about 5 miles of the State highway were widened to 18 feet, 20 feet on curves, and were banked. The widening was made with a mixture of hot sand and hot asphaltic oil, about 4 inches in thickness.

The Commission is trying this experiment, as it is comparatively inexpensive, and so far the work that was done last year has proved a success. If this year's work is successful, a relatively cheap method of widening the old roads on the Cape where the team traffic is light will have been discovered.

In Falmouth parts of the old road had been cut away by the vehicles turning out onto the soft shoulder, so that to secure the required 18 feet the sand and oil had to be put in for a width varying from 5 feet to 13 feet. The cost of this work on the 5 miles of road was \$12,754.

Wrentham-Worcester to the Cape.

The Commission has laid out about $2\frac{1}{2}$ miles of State highway in Wrentham to connect with the State highway in Foxborough. A road 18 feet in width was constructed of broken stone grouted with tar, and with an application of cold tar on the surface. A stone foundation had to be put in a part of the way. The road cost about \$24,500 to construct.

This road is on a secondary route that is being developed from Worcester to Taunton and so on to Plymouth, or Middleborough and points on Cape Cod. A part of it is covered by route No. 13, Worcester to Milford through Grafton and Upton, in the western counties bill. State highway or improved road has been built on this line in Milford, Bellingham, Franklin, Wrentham, Foxborough, Mansfield and Norton, and other portions of the road in Mansfield and Norton have been improved at the joint expense of the State and the towns.

A part of the road in Norton on the way to Taunton is to be constructed with a special appropriation made by the Legislature last year.

From Taunton there is an improved highway to New Bedford and from there to Fairhaven, Mattapoisett and Marion, or there is an improved road to Middleborough and most of the way from Middleborough to Plymouth. At Middleborough this route connects with a main route to all Cape Cod points.

This Commission expects to get this whole route completed in a few years if the towns and the city of Taunton co-operate.

Providence to Taunton and Middleborough.

In Taunton last year the work begun on the State highway on the road to Middleborough was completed, nearly one-half a mile being constructed at a cost of about \$5,000. A cement concrete road, 18 feet in width, was constructed, similar to that described in North Andover, Randolph and elsewhere.

The city of Taunton co-operated by constructing a section of road beyond the State highway towards Taunton, thus continuing its policy of the past few years of improving the city roads to meet the State highways constructed on various routes.

Taunton to Providence.

The State highway on this line was in places too narrow and needed resurfacing and widening. About 2 miles of road on this route were widened to 18 feet, the curves banked, and the top surface constructed of tar-macadam, the grouting method being used. This work was done in Taunton, Dighton and Rehoboth, and cost about \$13,000.

New Bedford to Wareham.

The same character of widening and resurfacing has been done on this route on about 3 miles of road. Work was done in Mattapoisett, Marion and Wareham, about \$22,000 being expended.

Fall River to Providence via Warren, R. I.

In Somerset about one-half a mile of State highway was laid out and constructed from the end of the State highway built in 1914 to the approach to the bridge over Lee's River at the Swansea line.

A tar-macadam roadway, 18 feet in width, was constructed by the grouting method at a cost of about \$4,000. A stone foundation was necessary on a part of the way.

The 1914 section of State highway was completed this year, costing over \$6,000.

In Swansea about $1\frac{1}{4}$ miles of State highway were laid out and constructed from the end of a macadam road built by the town to the Rhode Island line. This was on a new road previously laid out and graded by the county commissioners of Bristol County, but it had not been surfaced. It required a stone foundation for its whole length. This foundation was covered with tar-macadam, 18 feet in width, constructed by the grouting method at a cost of over \$13,500.

At Warren this road connects with the State highway to Bristol, R. I., on the south and Providence on the north.

Fall River to Providence via Seekonk.

This route has been all constructed so far as State highways are concerned, but many of the older highways need resurfacing and widening to be adequate for the present traffic.

Nearly $2\frac{1}{2}$ miles of road on this route have been widened, the curves banked, and a stronger surface constructed at a cost of over \$14,500. This work was done in the towns of Somerset and Swansea.

Hartford Turnpike.

It is claimed that the old Hartford turnpike ran through a great many towns, and in some of them two different roads are stated to be the turnpike.

The Commission has been helping to construct a road on this route for many years under the "small town" act; work has been done this year in Bellingham, Medfield, Medway and Millis. The county of Norfolk, the town and the State each contributed \$1,000, or \$3,000 in all in each town, and a gravel road is being constructed.

It is expected that this work will be continued until the whole road is completed. The county commissioners have also agreed to share the expense of constructing a short piece of road in Walpole on this same route.

The county, town and State have been building on a number of other secondary routes between Andover and Lowell, Woburn and Lexington, Reading and Concord, Concord and Sudbury, Concord and Wayland, and Wayland to Framingham, Bedford, Carlisle and Westford.

The State and the towns have been improving the road in the northern part of the State on the route between Lowell and Pepperell in Dunstable and Pepperell. The whole road has been completed, a gravel road having been constructed and oiled. This road connects at Pepperell with the State highway from Groton through Townsend and Ashby.

Another quite important route is being constructed on the line between Salem and Lynn in Wakefield, Reading and Wilmington.

A cross-country route is practically all improved from Hamilton through Topsfield and Boxford to North Andover and Lawrence. This is all a gravel road.

Secondary and Other Routes.

In addition to the main routes the Commission has been co-operating with the towns under the "small town" act and using motor vehicle fees in constructing and improving roads of

secondary importance to the State but of primary importance to the towns themselves. The full list will be printed in the tables under "small town" work and the expenditures from the "motor vehicle fees fund" under chapter 525 of the Acts of 1909.

Co-operation by the County Commissioners.

The county commissioners of many of the counties have been co-operating with the Commission during the last year or two much more than ever before. They have in a number of instances made the necessary layout and have paid all land and grade damages, sometimes at a very considerable expense, and in many other cases they have contributed towards the cost of the work. This fact has been mentioned where the particular road has been described elsewhere in this report. They have also contributed towards the cost of constructing a great many other roads, what might be classed as secondary routes.

In a good many places the counties and the towns each paid one-third of the cost of constructing a State highway. In many other places the town and the State share the expense. This enabled the Commission to build many more miles of road than it could have constructed if the State's money only were used.

The county commissioners of Berkshire County contributed towards the cost of constructing roads in three towns.

In Worcester County the commissioners contributed towards the cost of building roads in twelve towns.

In Plymouth County the commissioners have contributed towards the cost of improving an underpass and widening a bridge and some curves in one town.

In Norfolk County the commissioners have made quite expensive layouts in three towns and have paid the land and grade damages, and they have also contributed towards the expense of constructing the roads in six towns.

In Essex County the commissioners have made the layout in one town and paid all land damages, and have also agreed to contribute towards the cost of building the roads in four towns. This county has just completed the layout and grading of a very expensive stretch of new highway in Lawrence and Methuen on the route to Lowell, which is described elsewhere under that route.

In Middlesex County the commissioners have offered to contribute one-third of the expense of constructing any road on any route that both Boards can agree upon. This year they made a layout and paid the land damages in one town, and contributed over \$30,000 towards the expense of constructing roads in seventeen different towns.

The Commission has been constructing "small town" roads on a number of secondary routes all over the State. It is building on a number of routes to Plymouth, as from Middleborough, from Wareham, from Bridgewater, and from Brockton. These routes run through very poor towns and several of them are well on the way to completion, work having been done for a number of years in a number of different towns.

TREES ON STATE HIGHWAYS.

In 1915, as for the past several years, the work of suppressing insect pests on the trees on the State highways has been done under the direction of the State Forester, Mr. F. W. Rane. The results obtained have in general been most satisfactory.

Spraying was required in a number of localities to prevent the ravages of the elm-leaf beetle. This pest has made spraying necessary in many places where it was not required to prevent damage by the gypsy and brown-tail moths.

Mr. Rane's report appears in Appendix B.

During the last ten years, 23,664 trees have been planted on the borders of the State highways. This year the number of trees planted on State highways amounted to 2,739, and the Commission continued its policy of planting quick-growing trees and hedges to replace guard rails.

COST OF CONSTRUCTION AND MAINTENANCE.

The Commission is so often asked what the cost of construction is per mile for a road of a certain character that it has had the costs allocated on twenty different roads to show how impossible it is to give any answer that is even approximately correct.

These questions are often asked by the Governors or investigating committees of various States, the mayors of cities, etc., and an immediate reply is requested, sometimes by telegraph.

It is also asked what is the average cost of maintenance per mile; not being told what the traffic is, how wide the road is, what it is built of nor how old it is and how much stone is left, etc.; still an intelligent answer is expected. This cannot be given unless all the conditions are known.

On these twenty highways that were constructed, approximately 25 miles in length, the cost of drainage, culverts and bridges varied from \$63 a mile to \$4,100 a mile. There was a small concrete bridge on the last road. On most of these roads the drainage and small culverts cost from \$750 to \$1,500 for each mile of road constructed.

Grading and foundations on the new construction varied from \$1,200 a mile to over \$8,700 a mile. The total cost of grading and foundation on 23½ miles of road was about \$82,500, an average of \$3,500 a mile. On the Mohawk Trail some of the excavation cost at the rate of \$40,000 a mile.

These figures show how impossible it is to give any general answer that will be of value elsewhere.

COST OF ROAD SURFACES.

The cost of the hardened road surface alone may be of some value, though here again the cost depends on the availability of suitable local material, length of haul, cost of freight, price of labor, etc.

On four of these twenty roads a gravel surface was used. The cost of this gravel surface on the different roads was as follows: 15, 17 and 27 cents per square yard of surface, the depth being 6 to 7 inches.

On eleven of these roads the surface was constructed of a bituminous macadam. All but one were built of local stone; some were grouted with tar and some with oil asphalt. The thickness of the broken stone varied from 3 to 6 inches, less broken stone being used when there was a stone foundation. The top 2 inches on all these roads was grouted, and about 2 gallons of bituminous material was used to the square yard of road.

Four of these roads were 6 inches thick, local stone being used. The cost was as follows: 99 cents, \$1.02, \$1.03 and \$1.13 per square yard of surface.

Five were 4 to $4\frac{1}{2}$ inches thick, and they cost 54, 80, 81, 85 and 87 cents per square yard of surface. One was 3 inches thick and cost 40 cents a square yard, and a resurfacing of an old macadam 2 inches thick cost 61 cents a square yard.

One road in a country district was built of water-bound macadam 4 inches thick on a stone foundation, and this cost 40 cents per square yard of surface. This road will be coated with light oil in the spring.

Four of these roads were constructed of Portland cement concrete. These were all of an average thickness of $7\frac{1}{4}$ inches, and the cost was as follows: \$1.10, \$1.18, \$1.39 and \$1.60 per square yard.

These roads were all built on substantially identical specifications, and in each the cost of the concrete only is included. The last two roads, costing \$1.39 and \$1.60 per square yard, were on the same road, continuous work, and the material used in making the concrete was directly alongside of the road on the more expensive section.

The above figures illustrate clearly how misleading any general figures would be as to the cost of construction of various types of road or as to the cost of maintenance.

Some of the twenty-year old water-bound macadam roads have been maintained at a cost of \$100 to \$150 a mile. Suddenly they have to be resurfaced and widened at a cost of \$5,000 to \$10,000 a mile; this immediately jumps the average yearly maintenance cost up to \$350 to \$650 a mile a year.

Other sections of State highway built twenty years, where the traffic is heavy near the cities, have already been resurfaced three times, and the last time they were widened as well, and a bituminous macadam or other bituminous top was put on. The cost of maintenance of such a road would easily be \$1,000 or more a mile a year.

On quite a few of the older roads the traffic has become so heavy with the increase in the size and weight of motor trucks that the old road has had to be dug up and a foundation put in and the road rebuilt. This, of course, greatly increases the cost. Luckily this has not been necessary as yet on many of our roads.

MAINTENANCE AND RESURFACING.

With the increasing mileage of State highways, the tremendous increase in automobile traffic, and the use of heavy motor trucks for long distances to and from the larger cities, the question of maintenance becomes of vital importance. Some State highways are now twenty-one years old. Their average age is over ten years. Naturally, they are becoming worn out, and are not strong enough to withstand the heavy modern traffic.

Very many miles of road that were formerly built of macadam or gravel, from 12 to 15 feet in width, and from 4 to 6 inches in depth, were entirely adequate to carry the local vehicles which used them. The corners and curves were entirely safe for horse-drawn vehicles, but are now dangerous when used daily by hundreds of motor vehicles going at high speed.

What were formerly merely country roads have become main thoroughfares used for intercity and interstate traffic. The roads need widening, the corners and many curves must be improved to make them reasonably safe, and the surface, at least, on main through routes must be reconstructed, using some permanent form of construction that is capable of withstanding the modern traffic.

This will cost a very large amount of money, probably at least from \$8,000 to \$10,000 a mile; but the work must be planned for ahead and be done gradually, or in a few years many miles of State highway on the heavily traveled routes between our big cities will give out and go to pieces. The work should be planned and begun now, and at least 100 miles a year should be widened and reconstructed, so that at the end of five years 500 miles of road will have been so improved.

It must be remembered that nearly 500 miles of road have been built for from ten to twenty years, and many miles of these roads have not as yet been resurfaced. Of course, they are thin, worn out, and beginning to be broken through by heavy motor trucks, which are now so numerous.

Resurfacing and Widening.

The Legislature in 1915 appropriated \$250,000 for the ordinary maintenance, oiling and patching of the State highways. It also made an additional appropriation of \$100,000 for widening and resurfacing some of the roads that were too narrow and were wearing out. The Commission had available, therefore, for maintenance, widening and resurfacing \$350,000 appropriated by the Legislature and about \$850,000 obtained from the motor vehicle fees fund, making about \$1,200,000 in all.

The first and most necessary thing to be done was to maintain and keep in as good condition as possible the State highways already built, over 1,026 miles in length. This was done by constant patching and the use of bituminous covering. The drainage, also, had to be kept open, shoulders in condition, and the trees and shrubs that obstructed the view had to be cut.

On practically all the State highways there were either section men or repair gangs in charge of the maintenance to keep the roads at all times in proper repair.

Bituminous materials were used during the year on practically all the State highways that had not been constructed of concrete or paved, unless they had been recently resurfaced with bituminous materials. On many of these roads oil or tar had been used before, and a re-treatment was necessary.

Only a few years ago the authorities in charge of roads were not in agreement as to the necessity of using some bitumen, on the top surface at least, to preserve the roads. To-day there is so much motor traffic on all the roads that even in the little villages away off in the country they are appropriating money to oil or tar their road surfaces.

Every user of the roads has seen them torn up and disintegrated and practically destroyed in a few weeks or months whenever they were used by many motors. It made but little difference whether the roads were built of broken stone or of gravel.

The towns, when they can afford it, are oiling their dirt roads if many motors use them. If they are not oiled, on any main route the dust is intolerable not only to the inhabitants living

on the road, but it is blown long distances, settles on the fields, and injures or ruins the hay and other crops.

The Commission is allotting all the money it can make available from the motor vehicle fees to help the poorer towns to oil and preserve their improved roads that they have often been working on for many years. When the motorist discovers the improved road the number of motors using it rapidly increases, and, if the money cannot be secured to coat it with oil or tar, it is rapidly destroyed.

The Commission could easily use twice as much money as it has available to help in preserving these improved highways.

At the beginning of the year, the Commission had directed the engineers to maintain every mile of State highway in suitable condition, with a view to having as much money available as was possible for widening, resurfacing and strengthening. Acting on these instructions, the engineers accomplished a great deal this year. About 65.24 miles of State highway were resurfaced at a cost of over \$466,000. Of these roads, 46 miles were also widened from 3 to 10 feet or more.

The hardened surface on these roads was widened to 18 feet or more, with a 3-foot shoulder on each side. The corners and curves were banked, where possible, so that there would be no excuse for cutting the corners; and the crown of the roads was reduced to one-quarter or one-third of an inch to the foot, so as to spread the traffic over the entire road surface. Where it could be done at any reasonable expense, the hardened surface was made at least 21 feet in width at corners and on the curves, and an unobstructed view was obtained for a reasonable distance by cutting back the banks.

The corners have been improved and a better view obtained or the road surface widened at a large number of different places, and about 18 miles of road have been widened where no money was available for resurfacing. The widening cost over \$130,000. While over 64 miles of road were widened, but 46 of these miles could be resurfaced. The total amount spent for widening and resurfacing was \$597,200.

The Commission asked the Legislature in 1915 to appropriate \$200,000 for this very necessary work, but the appropriation made was only \$100,000. With the larger appropriation,



Reinforced Concrete Beam Bridge, Lee.

many more miles of road could have been widened and strengthened.

The Commission considers this work absolutely necessary not only to prevent the existing State highways from being destroyed by the constantly increasing heavy traffic but for the public safety. Fifteen feet, the old standard width, entirely adequate ten or twenty years ago, is not wide enough to-day, when every main through route, even in the country, is used so extensively by motor cars and trucks. The Commission has therefore asked the Legislature of 1916 to appropriate \$200,000 to continue this necessary work.

Up to the present time bituminous materials have been used either on the surface or in construction on practically all of the 1,088 miles of State highway. There are also a few miles of highway which have been built of concrete, or where a granite block or other pavement has been used.

BRIDGES AND CULVERTS.

A wooden pile bridge, 151 feet long, is being built between the towns of Edgartown and Oak Bluffs, over the Sengekontacket River, under the terms of a special act.

A concrete beam bridge was built in Lee, over the Hoosatonic River, of two spans $39\frac{1}{2}$ feet wide, each supported on a pier in the middle. The town of Lee was to pay for constructing the bridge if the expense did not exceed \$10,000.

Twenty other concrete bridges or culverts were constructed with spans varying from 6 to 25 feet. Six of these were built with a concrete slab; fourteen were built with reinforced concrete beams and floor.

In a number of instances the town or the town and county paid a part of the cost of construction.

The Commission gave engineering advice to the town of Natick, and designed a steel girder bridge with a 59-foot span, to be built over the Charles River.

Designs and estimates were made for nine other concrete bridges with spans varying from 16 to 50 feet. One of them has two 50-foot spans.

These bridges will be built in the near future by the municipalities or the Commission.

Further details of the bridges built this year are as follows:—

Bridges built.

Billerica — over Shawsheen River; concrete beam, 25-foot span.
Charlemont — over Patch Brook; concrete slab, 6-foot span.
Clarksburg — concrete slab, 8-foot span.
Edgartown — over Sengekontacket River; wooden pile, 151-foot span.
Grafton — over Miscoe Brook; concrete slab, 11-foot span.
Hinsdale — over Ashmere Lake; concrete slab, 12-foot span.
Lanesborough — over Town Brook; concrete beam, 13.67-foot span.
Lanesborough — over Town Brook; concrete beam, 16-foot span.
Lanesborough — over Town Brook; concrete beam, 15-foot span.
Lee — over Hoosatonic River; concrete beam, two 39.5-foot spans.
Lee — concrete slab, 11.5-foot span.
Leominster — over Falls Brook; concrete beam, 18-foot span.
Mansfield — over Rumford River; concrete beam, 19-foot span.
Natick — over Charles River; steel girder, 59.7-foot span.
New Ashford — concrete beam, 12-foot span.
Russell — over Potash Brook; concrete beam, 18-foot span.
Russell — over Potash Brook; concrete beam, 20-foot span.
Russell — over Potash Brook; concrete beam, 24-foot span.
Russell — over Potash Brook; concrete beam, 22-foot span.
Russell — over Potash Brook; concrete beam, 22-foot span.
Rutland — over Long Meadow Brook; concrete slab, 9-foot span.
Williamstown — over Green River; concrete beam, 25-foot span.
Williamstown — Hopper Road; concrete beam, 20-foot span.

Bridges contemplated.

Charlton — over Cady Brook; concrete beam, 21.5-foot span.
Danvers — over Ipswich River; concrete beam, 34-foot span.
Littleton — over Beaver Brook; concrete beam, 24-foot span.
Methuen — over Bartlett Brook; concrete arch, 16-foot span.
New Salem — over Red Brook; concrete beam, 24-foot span.
Northbridge — over Blackstone River; concrete arch, two 50-foot spans.
Oxford — over Low's Pond outlet; concrete beam, 18-foot span.
Rowley — over Dummer's Mill Brook; concrete arch, 19-foot span.
Washington — over West branch of Westfield River; concrete beam,
21-foot span.

PERMITS.

There were 886 permits issued during the year for opening or occupying State highways for various purposes.

TRAFFIC CENSUS.

The Commission believes that it is most important to have an accurate knowledge of the traffic which any particular road has to carry.

The road must be so designed, built and maintained that it shall be at all times in proper condition to bear the traffic to which it may be subjected, and not only at the least cost to the user, but also at the least ultimate cost to the taxpayers, taking everything into account, viz., interest, sinking fund, yearly maintenance and occasional resurfacing.

Knowledge of Traffic Necessary.

Without that knowledge one is really entirely at sea. The road builder is likely to make serious and costly errors by determining upon the wrong kind of construction and by selecting improper or unsuitable materials or methods.

Traffic Census on Roads in Massachusetts in 1909, 1912 and 1915.

The Massachusetts Highway Commission in 1909 had a census taken upon the State highways at 238 stations scattered throughout the State, and in 1912 a similar traffic count made at 156 stations, and in 1915 at 192 stations.

A traffic census was also taken at the same time at quite a number of points around the city of Boston on roadways in the metropolitan and Boston park systems.

The time and method of counting were identical at all points, and the full returns and methods will be found in our annual report for 1909, for 1912, and in the Appendix to this report.

How the Census was made.

The vehicles actually passing on the road were counted by observers who were engaged for the purpose. All vehicles were counted for fourteen hours a day (7 A.M. to 9 P.M.) for seven consecutive days in August, 1909, and again for seven days in October, 1909, at 238 stations, the daily census at each station being tabulated on a card.

This same census was made again for like periods of time in August and October in 1912, and again this year (1915).

At a few important points a count was also made at night, the census at these places covering the whole twenty-four hours.

Tabulation and Computation.

After the cards were received the number of vehicles observed at each point was tabulated and computed to show the average number of each class of vehicle passing the given point per day, the total number of vehicles and the total of each class, both motor and horse-drawn.

When these figures were obtained the percentage of each class of vehicle using the particular road was computed, and the percentage of the total of each class at all stations was computed as well.

After these averages were computed for each of the 238 stations in 1909 and for the 156 stations in 1912, and for 192 stations in 1915, the total average number of vehicles at all the various stations was added, the numbers ascertained, and from this was obtained the average number of vehicles passing each day at all the points where the count was made, as well as the average number of each class and kind, and the percentage that the vehicles of each class bore to the average total number.

Increases and Changes in Traffic in 1909, 1912 and 1915.

In Massachusetts the traffic using our roads is constantly increasing, but it is changing much more rapidly than it is increasing. This is conclusively shown by the following tables:—

Comparison of Traffic in 1912 and in 1915.

	1912 CENSUS (156 STATIONS).			1915 CENSUS (192½ STATIONS).			Per Cent. Increase or Decrease over 1912.
	Average Total Number per Day.	Average per Day per Station.	Per Cent. of Each Class.	Average Total Number per Day.	Average per Day per Station.	Per Cent. of Each Class.	
<i>Motors.</i>							
Runabouts,	5,819.0	37.2	11	15,746	82	13.5	+122
Touring cars,	27,178.5	173.5	49	73,207	380	63.0	+114
Trucks,	1,800.0	11.5	3	7,260	38	6.0	+230
Total,	34,797.5	222.2	63	96,213	500	82.5	+129
<i>Horse-drawn Vehicles.</i>							
1 horse, light,	8,380.0	53.5	15	6,886	36	6.0	-33
1 horse, heavy,	7,458.0	47.6	14	8,412	44	7.0	-7
2 or more horses, light,	556.0	3.6	1	613	3	.5	-17
2 or more horses, heavy,	3,870.5	24.7	7	4,417	23	4.0	-7
Total horse-drawn,	20,264.5	129.4	37	20,328	106	17.5	-18
Total all kinds,	-	351.6	-	-	606	-	+72

Comparison of Traffic in 1909, in 1912 and in 1915.

	1909. Average per Station per Day.	1912. Average per Station per Day.	1915. Average per Station per Day.	Per Cent. Increase in Six Years.
<i>Motors.</i>				
Runabouts,	20.8	37.2	82	+300
Touring cars,	75.3	173.5	380	+405
Trucks,	-	11.5	38	-
Total,	96.1	222.2	500	+420
<i>Horse-drawn Vehicles.</i>				
1 horse, light,	71.5	53.5	36	-35
1 horse, heavy,	49.3	47.6	44	-11
2 or more horses, light,	4.2	3.6	3	-28
2 or more horses, heavy,	26.0	24.7	23	-12
Total horse-drawn,	151.0	129.4	106	-30
Total all kinds,	247.1	351.6	606	+145

The above-mentioned figures represent a traffic count taken in 1909, 1912 and 1915 for fourteen days in each year, and from 7 A.M. to 9 P.M. on each day.

The average number of vehicles passing over the State highways a day was 247 vehicles in 1909, 351 vehicles in 1912, and 606 vehicles in 1915.

This represents the average number at each station. Naturally the number passing a given station each day varied,—from 125, or 20 on a road out in the country, to over 3,000 a day on a main highway near Boston.

The most important feature, however, is not the total increase but the change in the class of vehicles that are using the highways.

Motor vehicles, which had increased in numbers 131 per cent. from 1909 to 1912, from 96 to 222 a day, again increased 129 per cent. from 1912 to 1915, increasing from 222 a day to 500 a day.

On the other hand, the number of teams using the roads decreased on the average 14 per cent., from 151 a day in 1909 to 129 a day in 1912, and again the number decreased 18 per cent., from 129 a day in 1912 to 106 a day in 1915.

The net increase in the traffic was 72 per cent. from 1912 to 1915.

Comparison of Changes in Six Years.

The total number of vehicles using the State highways has increased 145 per cent. in the last six years, from an average of 247 vehicles a day in 1909 to an average of 606 vehicles a day in 1915.

What is even more astonishing is the change in the traffic. In 1909 the average number of horse-drawn vehicles was 151 a day, and there were only 96 motor vehicles a day.

In 1915, six years later, there were only 106 horse-drawn vehicles a day, as compared with 500 motor vehicles. The horse-drawn vehicles have decreased 30 per cent. while the motor vehicles have increased 420 per cent. in the last six years.

The decrease in the horse-drawn vehicles during these six years has been 35 per cent. in the light single-horse vehicle, 28 per cent. decrease in the two-horse light vehicle, 11 per cent.

decrease in the single-horse heavy vehicle, and 12 per cent. decrease in the heavy two or more horse vehicle.

In these six years the average number of light horse-drawn vehicles using the roads has decreased from 76 a day in 1909 to 39 in 1915, while the automobiles have increased from 96 a day in 1909 to 500 a day in 1915.

Motor Trucks.

As we stated in our report in 1912, motor trucks were rapidly increasing in numbers and were going over roads a long distance away from the cities. With their heavy loads and comparatively great speed, they will soon destroy any road that is not strongly built, with a strong surface on an adequate foundation.

Their increasing use of the roads is making it more and more expensive each year to either maintain, construct or resurface the roads. They make necessary stronger and deeper foundations, as well as stronger and more expensive surfaces on all main roads.

There were practically no motor trucks on the State highways in 1909. In 1912, however, there were $11\frac{1}{2}$ a day on the average, and they constituted 3 per cent. of the traffic.

In 1915 the average number of motor trucks was 38 a day, or 6 per cent. of the traffic. They just about equalled the light-drawn vehicles, of which there were 39 a day in 1915. One must realize that this 38 a day is the average number at all the 192 stations.

The number of motor trucks on main roads near the cities was, of course, several times greater. There were over 50 a day on the average on the State highway in Pittsfield, Lenox, West Springfield, Deerfield, Hadley, Northampton and Leicester, while Longmeadow had 76 and Chicopee 95 a day.

On roads running out of Boston, 15 to 18 miles out, there were usually between 30 and 70 a day. Blackstone had 29, Uxbridge 30, Wayland 88, Grafton 44, Shrewsbury 46, Lexington 60, Tewksbury 41, Andover 70, Salisbury 63, Lynn 96, Stoneham 52, Salem 139. These roads fairly represent through, inter-urban motor truck traffic between Boston and cities like Salem, Lowell, Lawrence, Worcester, etc.

There are certain roads where much of the local traffic is by motor trucks carrying ice, coal, hay, express, etc.

In Gloucester there were 143 motor trucks a day, in Beverly 208, Salem 209, Saugus 151, Somerville 131 on the road to Medford and 102 on the road to Malden, Boston 120, and Watertown had 339.

The same numbers of motor trucks are found south of Boston on the main roads. Quincy had 62, Dartmouth 130, Bridgewater 40, Middleborough 29, Marion 62, Falmouth 32, Seekonk 70, Harwich 48, Orleans 35, Attleboro 100, Brockton 70, Barnstable 84, Milton 120, and Hingham 132.

These figures show conclusively that our highways must be strong enough to withstand motor truck traffic.

Pleasure Traffic around Boston.

The census around the city of Boston in the metropolitan parkways and in the Boston city parks is interesting.

The following figures relate to the census taken in August, 1912, for a week, and in August, 1915, at the same points. The figures are the average number of vehicles a day.

Metropolitan Parks (mostly Pleasure Vehicles).

	1912.		1915.		Percent- age Motor Vehicles.
	Total All Vehicles.	Motor Vehicles.	Total All Vehicles.	Motor Vehicles.	
Lynn, Prescott Place,	1,530	1,411	2,344	2,297	98
Revere, Saugus River,	1,872	1,808	3,285	3,211	98
Somerville, Alewife Brook,	491	474	1,528	1,508	99
Medford, at Main Street,	515	492	1,051	1,039	99
Somerville, Wellington bridge,	2,528	2,174	4,155	3,853	93
Milton, Mattapan bridge,	2,383	1,717	3,907	3,535	90
Medford, Malden River,	1,884	1,848	4,614	4,597	100
Boston, Soldiers' Field,	-1	-1	429	354	83

Boston Parks (All Classes of Vehicles).

Prince Street, Jamaica Plain,	1,934	1,715	3,107	2,951	95
Commonwealth Avenue, Charlesgate East,	3,009	2,634	3,023	2,848	94
Columbia Road, corner Washington Street,	1,109	671	2,428	1,536	63

¹ No count.

It should be noted that heavy traffic is excluded from most of the parkways except for local traffic.

Here, again, on the traffic roads there were many motor trucks. In Revere there were 96 a day, in Somerville 127, in Milton 365, on Columbia Road 352 a day.

The increase in traffic is very remarkable on certain roads, for instance, in Medford, from 1,884 vehicles a day in 1912 to 4,597 a day in 1915.

Only on one road, Columbia Road, which is a traffic road, is there a large percentage of horse-drawn vehicles, and even on that road the motors are 63 per cent. of all the vehicles.

On the parkways proper and strictly park roads the percentage of motor vehicles varies from 95 per cent. to nearly 100 per cent. of the total traffic.

Traffic at Night.

The Commission had a count made at a few points for twenty-four hours, and the results shown in the following tables may be of interest:—

Day and Night, Twelve Hours Each, 1912 and 1915.

	1912.				1915.			
	AUTOMOBILES.		TOTAL VEHICLES.		AUTOMOBILES.		TOTAL VEHICLES.	
	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.
Lexington,	302	59	438	104	987	67	1,148	83
Watertown,	373	72	671	141	1,028	153	1,217	202
Chelsea,	103	10	358	53	248	43	618	111
Somerville,	266	70	689	231	311	68	593	101
Boston,	358	69	513	94	1,249	102	1,763	122
Total,	1,402	280	2,669	623	3,823	433	5,339	619

Twelve per cent. of the traffic over these roads was in the nighttime in 1915, and over 18 per cent. in 1912. It should be noted, however, that both the day and the night traffic increased, but the traffic in the daytime increased more in proportion. The traffic in the daytime increased about 184 per cent., while the traffic at night increased only 68 per cent.

In connection with this traffic census which was being made

at the different points, the city of Newton had a count of the traffic made at three different points on its main roads, the count covering twenty-four hours. The traffic in Newton is shown in the following table:—

City of Newton Traffic.

	AUTOMOBILES.		TOTAL VEHICLES.	
	Day.	Night.	Day.	Night.
Washington Street, corner Centre Street, . . .	1,816	218	2,274	258
Commonwealth Avenue and Washington Street,	2,798	500	3,027	524
Walnut Street, corner Washington Street, . . .	1,747	219	2,343	265
Total,	6,361	937	7,644	1,047

Here again 12 per cent. of the traffic was at night.

Computing several of the day and night counts shows that the average traffic at night is 12 per cent. of the total traffic which passes over a road; consequently, about 14 per cent. should be added to the count made in the day time and printed in the Appendix to ascertain the total number of vehicles passing over any particular road during the twenty-four hours.

Increase in Travel caused by Building a Good Road.

In some instances this is caused more by a diversion of travel from other roads in the neighborhood than it is by creating a new and pleasant route; in other places it is because a new and pleasant route is furnished, and, of course, always both causes enter in more or less.

Naturally, automobiles have brought in traveling, and put many places upon the map which were not there before, especially in New York and New England, where the woods, lakes, mountains and seashore furnish the great recreation and vacation resorts for the whole country.

A Few Specific Instances to illustrate.

The August census has been used in each case because it shows the summer travel.

There are two routes to Newburyport on the main line for

Maine and New Hampshire seashore resorts and also to the White Mountains via Crawford Notch.

In Rowley on the shore route, in 1909, there were 296 vehicles a day, of which 97 were motor vehicles. In 1912 there were 591 vehicles a day, of which 465 were motor vehicles. and in 1915 there were 759 vehicles a day, of which 650 were motor vehicles. Motor vehicles had increased from 97 a day to 650 a day in six years.

Newburyport Turnpike.

The Commission has been improving the Newburyport turnpike, using motor vehicle fees for the last five years. In 1909 it was a narrow, rough and hilly country road. It is now a very fair oiled gravel road 16 to 18 feet in width for 26 miles. It makes a second and shorter route to Newburyport.

The figures quoted represent the vehicles using the turnpike 20 miles out of Boston, practically all through travel. In 1909 there were 11 vehicles a day, of which 4 were automobiles. In 1912 there were 121 vehicles a day, of which 94 were automobiles; at that time the road was reasonably passable but not yet oiled. In 1915, when the whole road was improved and oiled, there were 347 vehicles a day, of which 341 were automobiles. There were 7 teams a day in 1909, and 6 in 1912; 4 automobiles a day in 1909 and 341 a day in 1915 six years later.

The Mohawk Trail.

What will happen when a new through route is opened, especially when the road runs through beautiful scenery, is well shown by the opening of the Mohawk Trail in the fall of 1914.

This highway is on the main highway east and west in the northern part of the State, and it connects Greenfield with North Adams. Before the trail was built, the road over Florida Mountain was very steep, rough and nearly impassable.

There are now on this route many miles of only reasonably good country dirt road, but it has all been widened and made safe and no grades on the trail are over 7 per cent. It is a most beautiful trip.

In 1912 on Florida Mountain, on this through route, there

were 30 vehicles a day, of which 7 were automobiles. In 1915 there was an average of 287 vehicles a day, of which 266 were automobiles. This was in August before the route became well known. In October there were 496 vehicles a day, of which 472 were motor vehicles, and on the Sunday before Labor Day there were 3,268 automobiles that passed over the mountain.

It is not at all unusual to see automobiles from eight or ten different States drawn up on the roadside to enjoy the beautiful scenery.

The increase in through travel on the through routes is well illustrated by the traffic count taken on the Jacobs Ladder route, the main line between Springfield and Pittsfield.

In 1909 there were many miles of poor road on this route; in 1912 the whole road was passable and there was no extremely bad road; in 1915 the whole road was in very good condition.

In August, 1909, there were 115 vehicles a day, of which 77 were automobiles; in 1912 there were 325 vehicles a day, of which 209 were automobiles; and in 1915 there were 553 vehicles a day, of which 462 were automobiles.

The same thing is true on Cape Cod, where the main road to Provincetown in 1909 was extremely bad, but by 1915 the whole road has been put in very fair condition so that motor vehicles could go the whole distance in high speed.

In Wellfleet in August, 1909, there were 77 vehicles a day, of which 31 were automobiles. In 1912 there were 133 vehicles a day, of which 105 were automobiles; and in 1915 there were 196 vehicles a day, of which 136 were automobiles.

The same thing is true all over the State, and the road builder must not only build his road for the traffic that is using it now, but he must anticipate and provide for the greatly increased traffic that is sure to come as soon as it becomes known that there is a good road on any particular route.

Motorists especially are always trying to find new routes and to see new country, whenever the roads are even fairly decent. When a really good road is built, they come in hundreds and thousands, especially if the scenery is attractive.

AID TO TOWNS FROM "SMALL TOWN" AND MOTOR VEHICLE FEES FUNDS.

Since the passage of the so-called "small town" act, the Commission has allotted from that fund about \$1,017,000 for the improvement of town ways, and the towns in which the work has been done have appropriated about \$715,000, making about \$1,732,000 that has been spent in the improvement of about 480 miles of road in 185 towns.

The Commission in 1915 allotted about \$128,000 under the provisions of the "small town" act, and improved about 50 miles of road in 85 towns, the towns contributing about \$100,500. In several instances in the richer towns, the town appropriated and spent much more money than that allotted by the Commission.

There is included in the amounts credited to the towns, in many cases, money appropriated by the counties to aid the town in improving the road, and in a few instances individuals interested in particular roads have also contributed.

In the opinion of the Commission, the work that is done in the "small towns," including the advice given to the municipal authorities, is the most valuable work that the Commission and its engineers are doing.

When work is done under the "small town" act, it is almost invariably done by the local authorities themselves, and in the manner set forth in contracts and specifications prepared and furnished by the Commission. The materials must be suitable and used as directed. In all cases the necessary drainage is taken care of.

The work is done under the supervision of one of the Commission's engineers; the local authorities who have charge of the roads are being educated in the building of these roads, including the selection of suitable materials, the method of spreading and rolling, and providing for drainage, foundations, etc., where necessary.

The road itself, when properly built, educates the whole community, as well as all the people who use it, not only as to the benefits secured from the use of a good road, but also, as time goes on, as to the economy of building a road in a proper manner with adequate drainage, foundation, etc.

The real difficulty comes in convincing the people that constant maintenance is absolutely necessary for the preservation of a good road. Every year the municipal authorities are realizing more and more the necessity for maintenance, and the number of cities and towns using some form of bitumen, not only to lay the dust, but to preserve the road as well, is increasing.

The Commission is doing all in its power to convince all road authorities that constant maintenance is not only absolutely necessary, but will save a vast amount of money.

Motor Vehicle Fees available for Through Routes.

The Commission allotted \$210,600 from the motor vehicle fees fund for use on the through routes in 111 towns this year, and the towns and counties contributed about \$220,000, making a total of \$430,600 available. This money was used in constructing, improving and maintaining many miles of road on routes that are much used by automobiles.

In many towns the Commission furnished the oil or tar that was spread upon the road, the town, at its expense, patching and preparing the surface, spreading the bitumen and covering it. By this work were preserved many miles of road that would otherwise under the motor traffic have raveled and disintegrated, if they were not destroyed in one year. The roads were also made dustless, affording much comfort to the traveling public, and, what is still more important, preventing the dust from becoming an intolerable nuisance to the abutting residents.

The Commission feels sure that in the benefit derived from the many miles of dustless State highways and town roads, and in the tire costs and other repair expenses which are saved because of the many miles of improved road, the owners and users of motor vehicles receive each year a value far in excess of the fees paid by them. These benefits would not be possible if the motor vehicle fees were not available for this work.

ENGINEERING ADVICE TO MUNICIPAL AUTHORITIES.

The requests for engineering advice are more numerous every year, and in all cases the Commission sends an engineer to look over the ground. In some cases the Commission

furnishes plans and specifications for the work, advertises the contract, and arranges for the supervision of the work, the municipality paying the estimates as they become due.

Almost invariably the advice of the Commission and its engineers is followed by the local authorities, resulting in better and more permanent construction of highways and bridges.

The Commission furnished engineering advice to 54 cities and towns this year, and these municipalities expended over \$250,000 of their own money for the improvement of highways and bridges.

Approval of Specifications.

By chapter 719 of the Acts of 1913, as amended in 1914, it is necessary that specifications for the construction of municipal ways be approved by the Commission before the town or city can borrow money on long terms for the work. Under this act 11 cities and 21 towns presented specifications for approval. In each case a study was made of the conditions as to materials, traffic, etc., and in some instances it was necessary to redraft the specifications to insure construction suitable for the needs.

Thus the Commission during the year gave engineering advice or approved specifications for the construction of roads in 86 cities and towns.

WORK DONE UNDER SPECIAL ACTS.

Sengekontacket Bridge, between Edgartown and Oak Bluffs.

The Legislature in 1915, by chapter 173, required the towns of Edgartown and Oak Bluffs to rebuild this bridge, known as the Sengekontacket bridge, with such allotment as the Massachusetts Highway Commission might make, and directed that after the bridge was rebuilt to the satisfaction of this Commission, it shall, together with the bridge between Oak Bluffs and Vineyard Haven, known as Lagoon bridge, be under the control and jurisdiction of the county commissioners of Dukes County, and that said county, excluding the town of Gosnold, shall thereafter pay the expense of the care and maintenance of both bridges.

This bridge is located over an inlet from the ocean into a large pond, and is on the dividing line between the two towns.

There were several hearings and discussions between the various interested parties before any definite plan could be decided on. Some people favored filling the whole inlet, and others desired a large waterway for motor boats. An agreement was arrived at. The Commission agreed to allot \$4,000 if each town would appropriate an equal sum. The towns appropriated \$4,000 each, making \$12,000 available in all.

The old bridge was built of piles and was in very bad condition. It was on the main road between the towns of Edgartown and Oaks Bluffs, and was located between two sections of State highway.

The old bridge was so located that there had to be quite an abrupt turn in the highway to get onto the bridge. It was 310 feet long and had an opening between the spans of piles of only 8 feet.

A survey was made and it was decided to relocate the bridge, building the new bridge nearer the ocean, thereby straightening the highway when the new approaches are built. This will be a great improvement. It also allows the old bridge to be used while the new bridge is being constructed.

It was decided to build a pile bridge 150 feet long and to fill in on the approaches on the causeway. The bridge will have 10 spans of 4 piles each, with 2 spur piles, and it will be 24 feet wide. The span over the inlet will have a 15-foot clear opening between the piles, for motor boats, in place of 8 feet on the old bridge, and there will be $2\frac{1}{2}$ feet more head room than there was on the old bridge.

It is to be built of creosoted pine piles 28 feet long, with a floor made of 3-inch spruce planks, with 2-inch planks on top. All the planking and timbers are to be creosoted.

The contract requires the removal of the old bridge, as well as the construction of the new one, and the work has been commenced. Unless some unforeseen difficulties occur the bridge will be built for the \$12,000 that is available.

Concord Avenue, Cambridge.

The Legislature in 1915, by chapter 196, authorized and directed the Commission to improve Concord Avenue, Cambridge, from Walden Street to the Belmont line, a distance of

6,900 feet. This is the main road to the town of Belmont, and the portion of the road in Cambridge has been in extremely bad order for many years, becoming nearly impassable in the spring when the frost is coming out of the ground.

It was authorized to expend not exceeding \$38,000 for this purpose, the expense to be paid by the Commonwealth in the first instance, and after the road is constructed the county of Middlesex is to pay to the Commonwealth 25 per cent. and the city of Cambridge 37½ per cent. of the cost of construction.

Plans and specifications were prepared, and they were approved by the city and county authorities. As there was not money enough available to build the entire width of the street from curb to curb, for a part of the way where there were houses and where that seemed desirable, the mayor offered to allow the commission to use some old granite block paving stones which the city had on hand. This paving was laid for a width of 4 feet on each side of the road for a portion of its length.

The city of Cambridge took the contract, but afterwards sublet it to Warren Brothers.

Before the construction was started the surface drainage was much improved, and as far as possible all pipe connections were made, or pipes were carried out to the side lines, for water, gas and sewer connections with houses or at street intersections.

It was decided to put a good bituminous mixture, 2 inches thick after rolling, on top of a well-compacted broken stone base. The subgrade was carefully prepared and rolled, and where the material was poor, gravel was put in under the broken stone.

This form of road surface was built 18 to 20 feet in width back from the Belmont line for a distance of 4,500 feet, and from there to Walden Street it was built 25 feet wide, with gutters 4 feet wide on each side made of the granite block paving, making a roadway from curb to curb.

The road surface and pavement were all laid this year, and the road is open to travel, though a little patching or shaping may be necessary in the spring.

The Commission had to narrow a portion of the roadway so as not to exceed the appropriation. It has, however, built a

wider and better roadway than was expected when the rough estimate of cost on which the appropriation was based was given to the committee on roads and bridges. This could be done for several reasons, because the city of Cambridge furnished the old granite block without charge and paid several other expenses, because the material in the subgrade was better than was anticipated, and so less gravel had to be carted in, and because quite low prices were secured for some of the material which was used.

Ashburnham.

The Legislature in 1915, by chapter 229, authorized the Commission to spend \$10,000 in the construction and improvement of the highway between the present terminal points of the State highway already constructed, known as the Rindge Road, leading from Ashby through the town of Ashburnham. This is on the road from Ashby through a part of the town of Ashburnham to the town of Rindge in New Hampshire, and so on to Dublin.

Roughly speaking, there are about 6 miles of road on this route that have not been improved, though a part of the road is a reasonably good country road for summer travel.

About $2\frac{3}{4}$ miles are in the town of Ashburnham, but the road is of no interest to the inhabitants of that town because it runs through a corner of the town where very few people live. In quite a few places, especially near the New Hampshire line, the subsoil was extremely bad, and the road was practically impassable in the spring or in wet weather.

The whole road required a stone foundation, and a great deal of drainage was made necessary because of many springs. This made it a most expensive road to build.

In 1911 the Commission constructed 3,550 feet of State highway beginning at the New Hampshire State line, and this road cost \$10,800 because of the bad soil and drainage conditions.

The work this year began at the southerly end of this section of State highway, and was built towards Ashby for a distance of 8,950 feet.

A gravel road was constructed 15 feet in width and 8,950 feet in length. The road is open to travel, but it is to be oiled

next spring. This makes an improved road about 12,000 feet in length southerly from the New Hampshire State line towards Ashby.

The Commission for the last three years, in co-operation with the county of Worcester and the towns, has been building as the main line to Keene, N. H., the highway leading from West Fitchburg through the towns of Westminster, Ashburnham and Winchendon to the New Hampshire line in the town of Fitzwilliam. The last section of this road to be built was in Winchendon, and this was completed this year, the town and State each paying one-half the cost.

Highway from Cotuit Village in Barnstable, through a part of Mashpee, to the Road to Falmouth.

The Legislature in 1915 appropriated \$14,000 and authorized the Commission to expend it in the construction of a highway from a point about one-quarter of a mile east of the Santuit River at the corner of Grove and School streets in Cotuit village to a junction with the Mashpee State highway on the old Falmouth road. The construction was to include the building of a bridge over the Santuit River and the building of any other bridges that might be necessary.

Only a short piece of this road is in the town of Barnstable, the rest being in the town of Mashpee. The whole road is through an entirely unsettled country, part of it having a small growth of scrub oak. In some places a few wood roads have been laid out.

Surveys have been made over two routes, and the distance by either route is about $2\frac{1}{2}$ miles, though on the northerly route for a portion of the way the location would follow an old highway which would have to be surfaced, as it is now a sand road.

The Commission was requested last winter to give the committee a rough estimate of the probable cost of constructing a road there, using sand and asphaltic oil.

There was not time to even locate a route, so that it was impossible to do more than make a rough guess. This guess was \$22,000, whereas only \$14,000 was appropriated. Now that surveys have been made and an approximate estimate can

be made, it appears that the southerly route will cost \$36,000 or more to construct, and the northerly route being in part over an existing highway will cost about \$27,000 to construct. In both cases the estimate is for the construction of a road built of sand and oil.

The investigation shows also that the southerly route, crossing as it does the Mashpee River, will not only involve the construction of quite an expensive bridge, but that the road will for a considerable distance go over soft and marshy land, so that some very expensive construction might be necessary to prevent the road from settling out of sight in the marsh.

The northerly route is over much higher land, and therefore the cost of construction can be estimated more accurately.

The Commission has intimated that if the rights of way can be secured for the construction of a highway by the northerly route, without expense to the Commonwealth, the Commission will build the highway on that route, making some of its other funds available for the purpose in addition to the \$14,000 special appropriation made by the Legislature.

The Highway between North Brookfield and Barre Plains.

The Legislature in 1915, by chapter 257, appropriated \$10,000 for the construction or improvement of the highway from North Brookfield to Barre Plains, beginning at the New Braintree and North Brookfield line and building northerly in New Braintree towards Barre Plains. .

A survey has been made on this line, an estimate made, and a contract has been advertised and let late this year for the construction of about $1\frac{1}{4}$ miles of road.

There was no good gravel obtainable, so that a water-bound macadam road 15 feet in width with 3-foot shoulders on each side will be constructed.

The soil conditions are extremely bad for the whole length of the road, so that a stone foundation will have to be put in in order to make a reasonably permanent road that will be passable at all seasons of the year.

The town of North Brookfield appropriated \$2,000 and the Commission allotted \$2,000 to be used in extending this road from the New Braintree line southerly towards North Brookfield.

A contract was prepared calling for the construction of a macadam road made of local stone, the road to be coated with oil after it was completed. This contract was sent to the selectmen, but has not been signed as yet, so no work could be done on the road.

The Highway on the Province Lands and in Provincetown.

The Legislature in 1915, by chapter 195, directed this Commission to lay out as a State highway the road that had been constructed on the Province Lands, together with the highway extending from the boundary line of said Province Lands to the railroad crossing on Conwell Street in the town of Provincetown. No appropriation was made for any work on this road, and the Commission was directed merely to maintain the road "in substantially the same manner and condition in which it is now maintained."

It was represented to the committees of the Legislature that no money need be expended in constructing this road because it was already constructed and in sufficiently good condition, but, as it only led to the Province Lands, the State should maintain it in its present condition.

The length of the road on the Province Lands is 10,300 feet. This piece of road was built under the authority of a special act of the Legislature in 1913, but only \$5,000 was appropriated; consequently, the Commission could only build a road 12 feet in width, and this was built of sand and asphaltic oil by the layer method.

From the boundary of the Province Lands to Conwell Street is 3,150 feet. The extreme width that can be obtained on 700 feet of this road is 25 feet, without making serious and expensive land takings. It is proposed to lay out the highway only 25 feet wide for this 700 feet, and to lay out the balance of the road 50 feet in width. To do this, however, a little land is needed in several places, particularly near the cemetery. As soon as the necessary releases are secured the layout will be made.

To make this road wide enough and adequate for the traffic that might use it, if many motorists wish to go to the lighthouse and beach, would require a considerable sum of money.

The Commission last year and this has allotted \$750 in all to be used in shaping, patching and repairing this road, and the road has been kept in fully as good condition as it was when the Commission was authorized to take it over as a State highway.

Milford to Southborough via Hopkinton.

The Legislature in 1914, by chapter 711, appropriated \$10,000 to be spent on this road, and in 1915, by chapter 232, \$5,000 more was made available.

There is considerable traffic for a country road between Hopkinton and Milford, whereas beyond Hopkinton the road going towards Cordaville, a part of Southborough, is of very little importance.

It seemed to the Commission that while the town of Hopkinton was relatively poor, the town of Milford could afford to build its own road. Moreover, the worst part of the road was in Hopkinton. The authorities in Milford were entirely willing to have all the money spent on the road in the town of Hopkinton.

The work there started at the Milford line, and the \$15,000 available has been spent in building from that point towards the town of Hopkinton.

The work was done by the town of Hopkinton under the supervision and advice of our engineers, and most excellent results were obtained for the money available.

On the existing road the alignment and grade were very bad and had to be changed; the road was very narrow and had to be widened, and in some places the subsoil was loamy and wet, so that a foundation of stone or gravel was needed in the sub-grade. This, of course, made the work expensive.

A water-bound macadam road, 18 feet wide and 6 inches thick, has been constructed of local stone, 8,000 feet in length. The road was graded 23 feet wide in the cuts, and 25 feet wide on the embankments.

It was agreed between the Commission and the authorities in the town of Milford that each should appropriate \$2,500, to be expended in improving or constructing this road in Milford. The Commission allotted \$2,500 from the motor vehicle fees fund.

It was also agreed that the money appropriated by the State should be expended beginning at the Hopkinton line and extending towards Milford, this being a continuation of the work that had been done in Hopkinton, and that the town's money should be spent on the Milford end of the same road.

The Milford money was spent on a part of the road that had already been widened, graded and covered with gravel. The town this year put on local stone from 3 to 4 inches in thickness, grouted with tar, for a distance of 1,500 feet.

The money available from the State was spent in widening and grading the old road, and building a water-bound macadam road 18 feet in width and 6 inches thick of local stone, about 1,300 feet in length.

This makes over 2 miles of road that have been constructed on this line during the past two years.

Norton to Taunton.

The Legislature in 1915, by chapter 230, appropriated \$12,000 to be expended in the construction of a State highway from the town of Norton towards the city of Taunton, over what the Commission deemed the best route.

There are a number of different roads that could be followed, though in the main there are two or three routes which are alternate roads that could be followed part of the way.

The commissioners have personally been over both routes, and several of the alternate roads that could be used. It has had a large number of letters or petitions from the citizens of Norton asking to have the highway constructed over some particular road.

The distance from Norton Center to Taunton Center is about the same by either route.

The Commission had a survey made of the road in Norton following the car line. The highway location on this route is in many places altogether too narrow, especially with a car track inside the locations. There are several extremely bad and dangerous corners that also need improvement.

Altogether it was evident that a satisfactory road of suitable width could not be constructed over this route unless it was relocated in one place and the location was widened quite ex-

tensively in many other places and the corners improved. Moreover, many changes in grade and alignment would have to be made in the electric car track if a satisfactory State highway 18 feet in width, with 3-foot shoulders on each side and the necessary gutters, was to be constructed.

When the survey was made it was found that the road could be straightened, shortened, and some very dangerous corners eliminated by taking a new location through some wooded land. This cut-off would be about 2,000 feet long and nearly 1,000 feet shorter than following the old road.

On November 23 the Commission had a conference with some of the selectmen and other officials of the town, and several representative citizens.

They all favored having the highway constructed on Taunton Avenue following the car tracks. They also favored the new location through the neck of the woods, so called, and stated that they thought the land necessary for the right of way could be obtained easily.

It was also represented to the Commission at the hearing that it was believed that the street railway company would be willing to make any necessary changes in its tracks, and that on the balance of the road, beyond the cut-off, the necessary land could be secured for a location of proper width.

The Commission stated that it would not feel justified in constructing a highway upon this route unless the required width of location could be secured, the land for the cut-off, and sufficient width of location everywhere to make the road safe and to permit the construction of a modern highway with at least 18 feet of hardened surface with 3-foot shoulders on each side and all necessary gutters, culverts and drainage. Also, that where necessary, the car tracks should be relocated so that a suitable highway could be built and that the land and all land damages must be either released by the owners or assumed by the town so that no expense would fall upon the Commonwealth for land or grade damages.

The representatives of the town and the others present stated that they thought there would be no difficulty in securing all that was required or in having the town agree to assume all damages.

A plan has already been prepared and sent to the selectmen, and if the necessary releases are secured, the work will be started early in the spring.

The Commission believes that when this road is built it will have to carry a considerable traffic, especially motor vehicles, and that it must therefore be constructed with some form of bituminous top, 18 feet in width. On part of the road the soil is loamy and clayey, and a stone foundation will be necessary if the road is to remain in good condition for any considerable length of time. All this costs a good deal of money, so that it seems probable that with the \$12,000 available only about 1 mile of road can be built. It is about 3 miles from Norton Center to the Taunton line.

If the town and county would co-operate with the Commission in continuing the construction of this road, as is being done in so many towns in the other counties, it could be completed in a short time with the money provided by the town, the county and the State.

The city of Taunton has already built a good road for a considerable distance in Taunton, on this route, and the Commission believes that that city will co-operate on this line as it has on others by constructing an improved highway for the rest of the distance in Taunton, to connect with the highway to be built in Norton.

Egremont over Molasses Hill to connect with the New York State Highway to Hudson.

Several years ago the State of New York constructed a State highway of bituminous macadam from Hudson to the Massachusetts State line in Egremont, a distance of about 20 miles.

In order to obtain a reasonably good grade the highway was relocated and constructed to the Massachusetts line on a location considerably lower than the existing road over Molasses Hill in Egremont; consequently, the New York State highway ended in a high bank at the Massachusetts line.

The State, county and town co-operated at that time in building about 1,700 feet of road on a new location in Egremont to connect the New York State highway by an easier grade with the existing road in Egremont.

In 1914 the Legislature, by chapter 733, made a special appropriation of \$15,000 to continue the work upon this road over what is known as "Molasses Hill."

It became evident as soon as the conditions were studied that a much better road with much less grade could be built if a part of the highway was built upon an entirely new location. The grade on the old road was over 12 per cent. in several places, and it was extremely crooked and dangerous. There was considerable doubt under the precise wording of the special act, chapter 733 of the Acts of 1914, whether the Commission had any authority to abandon the old highway and adopt a new location.

The Berkshire County Commissioners agreed that if the necessary authority could be secured they would lay out a highway upon the approved location, and that the county would pay all the land and grade damages.

The Commission therefore recommended to the Legislature in 1915 that it be given authority, whenever any money was appropriated to be used by it in constructing or improving any particular road, to expend it in whole or in part upon a new location. By chapter 8 of the Acts of 1915 this authority was conferred upon the Commission.

By relocating the highway for a part of the distance a location was secured where the maximum grade was only 7 per cent., and where good curves could be secured.

The county made the necessary layout, and after this was made the Commission laid out a State highway from the New York State line back towards South Egremont for about $2\frac{1}{4}$ miles.

A contract had been let in the fall of 1914 for the construction of those portions of the road that were to be built upon the old highway location, with an agreement with the contractor that the balance of the highway should be constructed on the new location when that was authorized and laid out.

The Commission will allot enough money from its regular funds to pay the cost for the construction of this highway over and above the special appropriation of \$15,000.

The soil was extremely wet and clayey in most places upon this road so that a foundation of stone had to be put in, making the construction quite expensive.

A small section of road beyond on this route has already been improved under the "small town" act.

This route connects, about a half a mile westerly from the village of South Egremont, with a main route running south through Sheffield, on the so-called "Under Mountain Road" leading to New York and Connecticut points, upon which the Commission has been building State highway for several years, and which it expects to complete during the next year or two.

New Marlborough.

The Legislature, by chapter 754 of the Acts of 1914, made available \$10,000 for the improvement of the road from Southfield, a village in New Marlborough, to Clayton, a village partly in Connecticut and partly in Massachusetts.

This road is about 7 miles long. It was found impossible to start the work during the season of 1914, but a survey was made. Early in 1915 work was begun about 3,200 feet from Southfield post office, and for 4,700 feet the road was graded, widened, properly drained, and surfaced with a rather poor quality of gravel. On this 4,700 feet about \$4,600 was expended.

The next 2 miles were in very fair condition, and no attempt was made to do more than to shape it with a road machine and repair a few culverts.

From the end of this section 6,900 feet was built along the same lines as the first section, except that a rather better gravel was available for surfacing. This cost about \$5,300.

Most of the way the old road was followed, but occasional changes were made, the town of New Marlborough having agreed to assume and pay all land damages.

The engineers estimate an average traffic of twenty-five vehicles per day during the summer months, and ten vehicles per day for the balance of the year.

Salisbury Beach Road.

This road, about 2 miles along, was laid out and constructed by the Commission under the provisions of chapter 746 of the Acts of 1911, as amended by chapter 454 of the Acts of 1912.

This act required that the rights of way should be furnished without expense to the Commonwealth.

An act was then passed providing for a commission to take over the Salisbury Beach Reservation. This Commission made all the takings of land necessary for the construction of the highway, moved buildings, etc., and the highway was constructed.

The Supreme Judicial Court subsequently held that the act creating the Salisbury Beach Commission was unconstitutional. This decision left the question of the highway location in a very doubtful position.

The Legislature in 1914, by chapter 659, authorized this Commission to lay out the highway again, over the old location if it desired. The act also provided that the Commission should award damages to any person who was damaged by the taking of land or otherwise, and also authorized the Commission to assess betterments on any land, situated within a certain distance of the road, that in its opinion was especially benefited by its construction. The layout was made Jan. 26, 1915, the location being 60 feet in width.

The Attorney-General authorized the employment of a local attorney to look up the titles and to ascertain what damages, if any, had been suffered by any person. Experts on land values were consulted.

Before this highway was constructed back of the beach, there was no road at all by which the many cottages which had been built on the crest of the beach could be reached. The only practical way of reaching these cottages was by the electric car.

Since the road has been constructed it is lined with automobiles in the summer season and many private garages have been built. The Commission believes that all the property adjacent to the road has been considerably improved in value.

Believing as it does that almost if not quite all the landowners had been benefited much more than they had been damaged by the laying out and construction of the road, the Commission made a decree on Dec. 7, 1915, awarding to each landowner whose claim had not been settled damages of zero.

This award was made so that none of the owners would lose any rights, and so that they could file their petitions in court

to have their damages assessed, if they claimed any. The settlement of any claims that are made will be in the hands of the Attorney-General.

Revere-Traffic Road.

This road was constructed under the authority of several special acts of the Legislature. The first act was chapter 646 of the Acts of 1910, which authorized the expenditure of \$125,000 for purchasing or taking by eminent domain land for the purpose of eventually laying out and constructing a highway in the town of Revere from a point near the Point of Pines station to Revere Street. This highway was to have a location of 60 feet. Many lines were surveyed and studies made, with reports thereon to the Legislature from time to time, which will be found in earlier reports.

The time for the purchase or taking of the land was extended for two years by chapter 557 of the Acts of 1911.

By chapter 697 of the Acts of 1912, \$175,000 more money was appropriated, making \$300,000 available in all for the payment of the land damages and the construction of the highway, and the Commission was authorized to assess and collect betterments in accordance with the provisions of section 1 of chapter 50 of the Revised Laws, so far as applicable.

By chapter 639 of the Acts of 1913, a location 80 feet in width was authorized. The layout was made and a contract was let, and the highway was open to travel late in the fall of 1914, and the construction was completed this year.

Most of the land damages had been settled upon terms recommended by experts and attorney employed by the commission. These settlements were all made on the basis of the betterments being assumed as a part of the settlement, and in this manner over 87 per cent. of the land was secured. The settlements made included all but five parcels of the land taken, where, as was stated in last year's report, the damages were in dispute and the settlement was in charge of an attorney designated by the Attorney-General. The amount to be paid in these cases was determined by arbitration, and an award was made determining the amount of damages and has been paid.

By some inadvertence no betterments were seasonably assessed upon the few parcels of land where the betterments had not been assumed as a part of the settlement, but the Attorney-General has given us an opinion that he has very great doubt whether it would have been possible to enforce the collection of any betterments because of the provisions of the special act relating thereto which provided no method of enforcement.

The Commission is happy to report that this Revere Traffic Road has been completed and all claims for land damages paid for less than the appropriation. The total appropriation was \$300,000, and the expenditures were a little over \$281,500. The original appropriation in 1910 for the purchase or taking of land for the right of way was \$125,000; the payments made for land damages were just under \$69,500.

The cost of constructing the highway, including all engineering and other expenses, was about \$212,000.

Five Western Counties.

The Legislature of 1915 authorized the Commission to construct during the next four years certain specified highways in the five western counties.

It made \$2,000,000 available for this purpose. One-fourth of the money expended in any county was to be repaid to the State by the county, and the Commission was further authorized to use the money so repaid by the counties before Nov. 30, 1921, either in completing the specified highways or in improving a main through highway, or a highway to a railway station or connecting with an adjoining city or town, in any town in those counties when the town was not located on one of the specified routes, provided its valuation did not exceed \$1,000,000.

The county commissioners were directed to furnish the necessary rights of way in their respective counties, and to lay out such location as this Commission should approve or suggest.

There were seventeen routes specified, located in thirty-eight towns and one city.

Only portions of these routes have as yet been surveyed, so that even the length of the highways to be constructed cannot

be determined, but scaling the routes on the map shows that there are approximately 163 miles that will have to be constructed. Besides this, there are a number of miles of road on these routes that have been somewhat improved in the past under the "small town" act or with motor vehicle fees, where the road has been merely graded and drained, but the top surface could only be made of the best local material available, which often was not very good.

As many of these roads have been built for a number of years, it is evident that the surfaces will have to be constructed of better materials, because when the route is completed the traffic will increase in volume, and a surface that was adequate for the small number of local teams will not last at all when the road is used by several hundred motor vehicles a day.

On most of these routes the subsoil and drainage conditions are bad, and a foundation and considerable drainage will have to be put in at a very considerable expense. In the hill towns, especially, many of the grades are extremely bad and extensive grading will be necessary to secure a reasonably good grade. Many times it will be better to relocate the highway. On most of the roads the location is too narrow and too crooked, and extensive widening must be made.

In many towns — and probably in most of them — no suitable gravel can be obtained; consequently broken stone will have to be used, and in a few of the towns it is difficult, if not impossible, to secure a really good quality of local stone, the stone being too soft or brittle.

Consequently, the highways to be built on these routes will be comparatively expensive to construct because of the present extremely bad local conditions. It is these very conditions that make it advisable to construct an improved highway, because the present highways leading to these towns are practically impassable when the frost is coming out of the ground, and are so steep, rough and dangerous at all times of the year that no one uses them except from absolute necessity.

It is evident, if all these highways are to be built in a substantial manner, that it will be necessary for the towns that can afford it to co-operate with the Commission by appropriating money to be used with the money made available by the

Legislature, as very many of them have been doing for several years past.

Some of the towns perhaps cannot afford to do much, but all can do something and many of them can afford to do a good deal, thus insuring the speedy construction of their road, and enabling the Commission not only to secure a better highway but also to assist some of the poorer towns to secure a reasonably good highway on their most important road.

Following is a statement of what has been accomplished on different routes.

No. 1.— From Great Barrington south through Sheffield to the Connecticut State line, about 9 miles.

Plans and estimates have been prepared, and a contract let for the construction of about 1 mile of highway in Great Barrington and nearly 3 miles in Sheffield.

This brings the improved highway to the village street in Sheffield.

This highway is now at such a low grade that it is occasionally overflowed for a few days by the water backing up from the river in the spring.

It was extremely expensive to raise the grade of the whole road high enough to be out of water at all times, and as the flooding of the road only occurs occasionally, the expense did not seem to be warranted.

The Commission is grading the lowest parts of the present highway up to the average grade. As the road would be subject to being covered with water in occasional spring freshets, the new highway is to be constructed of concrete, 18 feet in width.

Beyond Sheffield village south to the Connecticut State line, an improved gravel highway has already been built at the expense of the town and State, and it can be kept in proper condition by the use of oil and proper maintenance.

No. 2.— From Pittsfield to Northampton through the towns of Hinsdale, Windsor, Cummington and Goshen.

Considerable progress has been made on this route in past years. A State highway has already been constructed from Williamsburg to Goshen, and the road from Williamsburg to the Northampton line has been constructed at the joint expense of the town and State.



Golden Willows, Dennis, set by the Commission.

The State highway in Goshen and Williamsburg has been recently resurfaced and is now in good condition.

From Goshen westerly towards Cummington, the Commission has for many years been co-operating with the town, using money made available from the "small town" act and from motor vehicle fees. This road has now been completed to the Cummington line, and only a very little money was appropriated under chapter 221.

The road from the town westerly to the Cummington line was widened, graded and drained, and a stone foundation was put in. The local stone was not suitable for a macadam road, and so the best local gravel obtainable had to be used. If the traffic over this road becomes heavy, no doubt some better surface will have to be put on the road in the near future.

In Cummington the Commission has been working in co-operation with the town for several years past under the "small town" act and using motor vehicle fees. The work has been continued steadily this year, and it is planned to continue it until the road is completed. There are between 11 and 12 miles of road in Cummington on this route. Prior to 1915 the Commission had allotted over \$10,000 from the "small town" and motor vehicle funds for the work in Cummington and Goshen.

The work in Cummington has been of the same character as from Goshen westerly. The worst stretches of the road have been widened, graded and drained, a stone foundation has been put in where necessary, and the best gravel or material available has been used on the surface. When the traffic increases some, a better road surface will be necessary.

One concrete bridge was built at the joint expense of the town and State.

In Windsor two short sections of State highway were built many years ago, one a macadam road on the top of Windsor Hill, and one a short section in the easterly part of the town. The Legislature has made special appropriations amounting to \$40,000 in four years for this road, including the \$10,000 appropriated in 1914, and this has been expended together with \$10,000 allotted by the Commission from the State highway fund, in constructing the road up the hill from East Windsor

to connect with the old macadam road at the top of Windsor Hill. This was the worst part of the road; the grades were extremely bad, the subsoil clayey and very wet, and consequently the construction was very expensive.

A local stone macadam road was built and one fair-sized concrete bridge, and the road has been completed to the top of the hill, connecting there with the State highway.

From Windsor westerly to Dalton, part of the road running through the town of Hinsdale, the Commission has for many years been co-operating with the town in improving and widening the road, and a short section of local stone macadam has been constructed. The town has appropriated what it could, and the Commission has made money available from the "small town" and motor vehicle fees fund. This road is still in many places extremely narrow and dangerous, and the subsoil is very clayey and wet.

Careful surveys have been made and the Commission hopes that a location can be found over which a good highway of sufficient width can be constructed without any excessive grades. It expects to be able to let a contract for the construction of this part of the road in Windsor and possibly in Hinsdale early in the spring.

No. 3.—From the village of New Boston in Sandisfield up the Farmington valley through Otis and West Becket to the Jacob's Ladder State highway, about $13\frac{1}{2}$ miles.

In Otis about 3 miles of road has already been improved under the "small town" act. This work has been going on for about eleven years. This is a new route and it requires a careful investigation. A survey party has been sent out and the survey has been started, and the Commission expects to be able to prepare plans and specifications so that the work can be started in 1916.

No. 4.—From Bonnyrigg Four Corners in Becket through Washington to the existing State highway in Hinsdale, about 15 miles.

A good deal of work has already been done on the road from Bonnyrigg Four Corners towards Becket by the Commission and the town. In 1914 the Legislature made a special appropriation for use on this road, and a contract was let and a water-bound macadam road was being constructed.

The Commission allotted \$30,000 from the appropriation authorized by chapter 221 of the General Acts of 1915 to continue the work, and about 5 miles of water-bound macadam have been constructed. This new road was covered with a coat of light oil this fall.

In Washington work has been done in the past on this route by the town and the Commission under the "small town" act and using motor vehicle fees, and some 2 miles of road have been improved.

The present road in Washington beyond the work that was done in Becket has a bad grade crossing over the railroad, and one bad underpass. The Commission had just commenced building on this location when its attention was called to the possibility of adopting an entirely new location, thus doing away with the two crossings and securing better grades and alignment at probably no greater expense.

Consequently the work was stopped and the proposed new location was walked over. It was apparent that this new line was well worth a survey and careful study. The survey showed that the new route would be much better than the old, and work will be begun on it early in the year, as soon as the necessary location and right of way can be secured.

In Hinsdale the Commission and the town have been at work for several years in improving the road leading to Washington, and about 2 miles have been graded, widened and improved. This year the town appropriated \$1,000 and the Commission allotted \$2,000. This road and the 2 miles already improved in Washington will probably need a better surface when the whole road is built and the traffic increases. The road beyond in Hinsdale is already State highway, and part of the road in Dalton has been improved. The Commission hopes the town of Dalton will co-operate by improving the balance of the road in that town so that when the road is completed in Washington and Hinsdale the whole route will be a continuous improved highway.

No. 5.—From the main highway in Huntington northerly through Worthington to Cummington to connect with the main highway from Dalton to Northampton (see No. 2), about 20 miles.

Considerable improvement has already been made in this

road both in Huntington and Worthington during the past few years, both under the "small town" act and with the motor vehicle fees, both towns having contributed towards the cost of the work. The work already done consisted of widening, grading, improving the grades, etc., and surfacing with the best local material available. About 2 miles of road have been improved in this manner in Huntington, and 3 miles in Worthington.

A survey has been made from Huntington village to Worthington, and work has gone forward at two points, and an attempt will be made to do a large portion of the work on this section of the road during the next year.

There are so many other roads of more importance to be constructed that it is doubtful if any work will be done on the road between Worthington Center and Cummington during 1916.

No. 6.—From Hinsdale easterly through Peru to Worthington, to connect with the road on route No. 5, about 11 miles.

The Commission has been working for several years in Peru in improving the road to Hinsdale, which is their main market and where the railroad station is.

The town has appropriated money for this purpose, the county of Berkshire has helped, private individuals have subscribed, and the Commission has allotted money from the "small town" fund and from the motor vehicle fees.

The grades on this road were extremely bad, the soil was very wet and clayey, and many times in the year and always in the spring the road was practically impassable.

The work consisted of widening, extensive grading, draining, and for its entire length the subsoil was so bad that a stone foundation was necessary. The surface had to be made from the best material available, and this material was not of very satisfactory quality.

The road has been completed from a point just east of Peru village to the Hinsdale line, a distance of about 2 miles.

Much work has also been done in Hinsdale on this line. This year Hinsdale appropriated \$2,000 and the Commission allotted \$2,000, making \$4,000 available for use on the Peru road. The Commission also allotted \$5,000, available under chapter 221, to continue the work.

It seems probable that the part of this road in Hinsdale can be completed in 1916.

No. 7.—From Plainfield to Cummington, about $4\frac{1}{2}$ miles.

No work has been done on this route because the Commission was requested not to do any work by a great majority of the citizens of Plainfield. They state that the road from Plainfield Center to the Ashfield line is much more important, and they requested the Commission to refrain from doing any work until they could attempt to get the Legislature to authorize the substitution of this road for the proposed route to Cummington.

No. 8.—From Belchertown through Enfield and Ware to Palmer via the State hatchery, about 17 miles.

A survey was made early in the year on the road between Ware and Palmer, and a contract has been let for the construction of about 3 miles of a local stone macadam road.

The work of construction is well under way, the Commission having already allotted \$20,000 for the work that can be done this year, though, of course, considerably more money will be needed to complete the 3 miles.

There is a very blind underpass on this route where the road goes under the tracks of both the Boston & Maine and Boston & Albany railroads. A plan has been made whereby the conditions here can be greatly improved and almost all danger eliminated.

The matter has been taken up with the town authorities, the Hampshire County Commissioners, and the representatives of both railroad companies, and the Commission expects that the underpass can be reconstructed and the road relocated. The Commission has agreed that if this is done, it will expend \$8,000 in relocating and constructing the highway.

Surveys have been made in Ware and Belchertown on the road to Belchertown, and the Commission expects to be able to let a contract for the construction of a considerable stretch of road on this line in 1916.

No. 9.—From Granville Corners through Southwick to Feeding Hills in the town of Agawam, about 12 miles.

On this route the Commission has been working with both the town of Granville and the town of Southwick for several

years under the "small town" act and using motor vehicle fees. About 2 miles of gravel road have been built in Granville and about 2 miles in Southwick.

No. 10.—From South Deerfield through Conway to Ashfield, thence through Spruce Corners to Lithia in the town of Goshen, to connect with the highway between Pittsfield and Northampton.

In Deerfield there are about $2\frac{1}{2}$ miles of road. Plans have been prepared and a contract has been let covering most of this road, and considerable work has already been done. A water-bound macadam road is being constructed, 15 feet in width with 3-foot shoulders on each side.

The macadam surface has already been built for about 2 miles, and is to be coated with light oil. On the balance of the road in Deerfield the survey and the engineer's preliminary report have been made, so that the work can be continued without interruption in the spring.

In Conway the town has a contract for the construction of a gravel road 18 feet in width and about one-half a mile in length. The grading has been completed and a part of the surfacing has been done.

Also, on this same route, the town of Conway has built 1,750 feet of gravel road, 18 feet in width, beyond the above work, under the provisions of the "small town" act. During the last twelve years the town and the State have been co-operating in improving this road, and over $3\frac{1}{4}$ miles of gravel road, 15 feet in width, have been constructed. The drainage and subgrade are all right on this part of the road, but some of the older sections need resurfacing, and possibly if the traffic increases, the road should be widened. This improved road extends to "Burkeville" in the town of Conway.

From Burkeville to Ashfield the survey has been made.

In Ashfield towards Conway during 1915 a gravel road, 18 feet in width and 2,000 feet in length, has been built.

The town of Ashfield has a contract, under the provisions of chapter 221, calling for the construction of 2,500 feet more gravel road, 18 feet in width. The road has been already graded and a part of the gravel surface has been put on.

From Ashfield towards Spruce Corners and Lithia, the town of

Ashfield constructed in 1914 nearly 1 mile of gravel road 16 feet in width.

No. 11.—From Northfield through Gill to Turners Falls to connect with the main line of State highway, about $6\frac{2}{3}$ miles, most of the road being in the town of Gill.

In 1905 and 1907 the town of Gill, co-operating with this Commission, built 2,700 feet on the south end of this route under the "small town" act. This section will require a stone surface.

In 1909, 1910, 1911 and 1914 nearly 6,000 feet of gravel road, 15 feet in width, were built under the "small town" act by the town in co-operation with the Commission. Most of this road is still in good condition.

No. 12.—From Athol to Worcester through Petersham, Barre, Oakham and Rutland.

It is about 36 miles from Worcester to Athol by this route, which is one of the main secondary routes in the State.

It is one on which the Commission has been working for many years, portions of the road having been already constructed as State highway, and other portions having been constructed or improved under the "small town" act and with motor vehicle fees. The towns of Athol, Petersham, Barre, Oakham, Rutland and Holden have co-operated during the past few years. The county of Worcester has also appropriated money to help build this road in Rutland, Oakham and Barre.

There were already approximately 11 miles of State highway on this route, the road being practically completed to Rutland Center when chapter 221 was enacted. Portions of the road had been improved in all the other towns as well.

It is about $2\frac{1}{2}$ miles from the Athol fair grounds to the Petersham line, and this road has been improved at the joint expense of the town and this Commission three different years.

In 1911 and 1913, 9,200 feet of gravel road, 15 feet in width, and in 1915, 3,760 feet of gravel road, 18 feet in width, were built at the joint expense of the town and State, the Commission using motor vehicle fees.

In Petersham, from the Athol line to Petersham Center, over 4 miles of gravel road, 15 feet in width, have been built by the town and the State jointly under the "small town" act

and with motor vehicle fees. This work was done from 1904 to 1913.

Between Petersham Center and the Barre line, the town in 1913 and 1914 built over 1 mile of gravel road, 18 feet in width. In 1915, 3,650 feet of gravel road, 18 feet in width, were built, the Commission allotting money from the motor vehicle fees. During the last three years the town has expended over \$6,300 on this work, and the State over \$7,000.

A contract has been let for the construction of about three-quarters of a mile of road from the Barre line northerly towards Petersham. The contractor is now at work upon this road, which is to be built of local stone macadam, 18 feet in width, coated with light oil.

About 6,000 feet remain to be built in Petersham, and this has been surveyed, reported on, and can be built early in the spring, and will probably be built of local stone macadam, as there appears to be no gravel of good quality obtainable near the work.

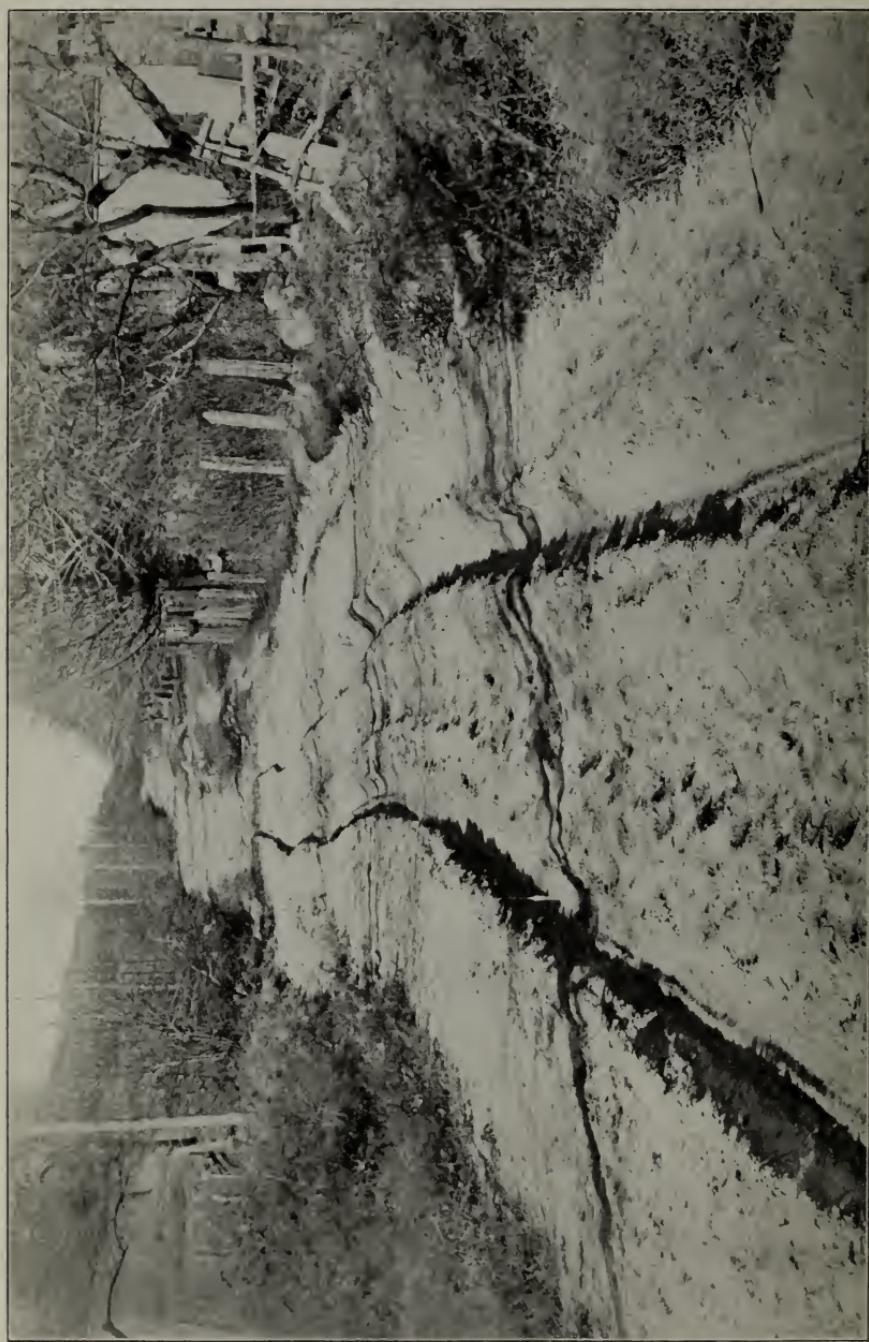
From the Petersham line south towards Barre Center, the Commission allotted some of the motor vehicle fees in 1914, and the town built 5,900 feet of gravel road, 18 feet in width. This was covered with light oil.

Just beyond this section a contract has been let for the construction of 8,680 feet of local stone macadam road, 18 feet in width. All the stone has been put on this section, but it will probably need rolling and oiling in the spring.

Beyond this section there is nearly one-half a mile of local stone road built by the town and this Commission jointly in 1915, the commission's money being allotted from the motor vehicle fees.

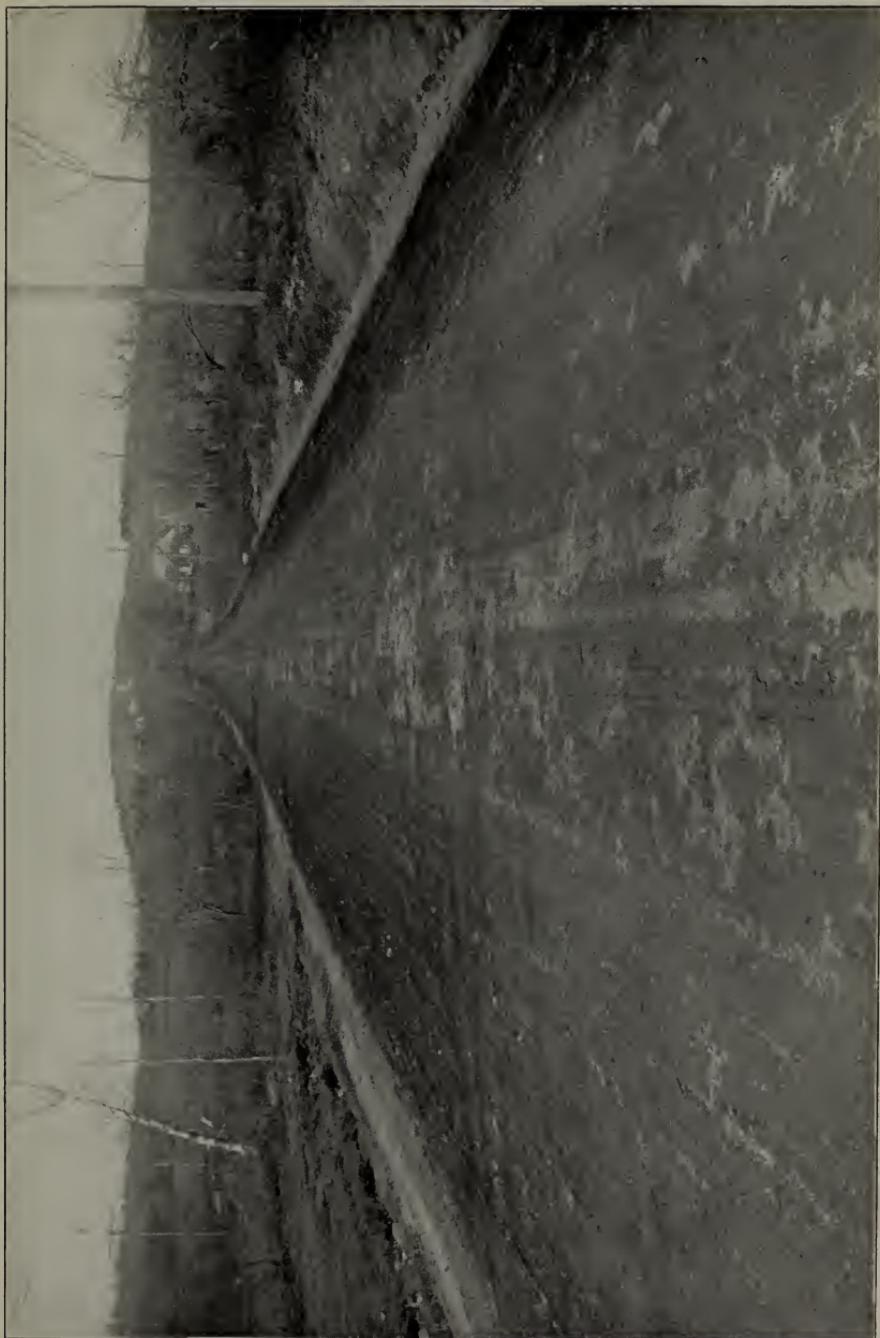
From this section southerly to Barre Center is a local stone macadam road built by the town some years ago, which is now in need of resurfacing.

From Barre Center southerly for nearly 3 miles is State highway, surfaced with trap rock with a bituminous treatment. From the southerly end, of the State highway to the Oakham line, a distance of about $1\frac{1}{2}$ miles, was built of gravel in 1912 and 1913, at the expense of the town and State, the Commission having used motor vehicle fees. The town of Barre and



"Western Counties" Road in Becket before Improvement.

"Western Counties" Road in Becket after Improvement.



the State have during the last three years each expended \$5,500, or \$11,000 in all, on the above roads.

In Oakham, on this same route, the State and town have been co-operating for the last three years, and the county of Worcester has helped the town for two years. The State has put in over \$3,500 from "small town" fund and from motor vehicle fees, and the town and county have appropriated \$2,160, making over \$5,700 available. Over 2 miles of the road have been widened, graded and drained, and a gravel surface has been put on.

There are about 3,500 feet more road in Oakham that must be built on this line, and a contract has been let for the construction of this section of road in connection with the road that is being built in Rutland.

In Rutland the whole road from Rutland Center to the Holden line has been built and is now a State highway.

From Rutland westerly towards Barre the road has been widened and improved during the last three years by the Commission, with the co-operation of the county of Worcester and the town. The county and town have expended over \$6,500, and the State over \$6,500 from the "small town" and motor vehicle fees funds. Nearly 9,000 feet were improved, the work consisting of grading, widening and draining, putting in a foundation where it was necessary, and surfacing with the best material obtainable. This material was not of good quality, and if there is heavy traffic when the road is completed, a better surface will undoubtedly be required.

From these sections westerly to the improved road in Oakham, mentioned above, a distance of nearly 3 miles, a contract has been let and the work is well under way. A water-bound macadam road is being built, and it will be coated with light oil. This part of the road will be completed early in the year.

In Holden, under a special act of the Legislature in 1914, appropriating \$10,000, the Commission constructed about one-half of the uncompleted section of very bad road near the town. The act provided that upon completion the town should repay to the State \$1,500, and the county of Worcester should repay to the State \$3,500.

In order to complete this road the Commission got the town to appropriate \$1,500 more money, and the State allotted \$10,000 from the State highway fund, and the road was completed early in the year.

The Commission also laid out as State highway and constructed a section of road about 3,700 feet long between two sections of State highway, where a grade crossing had been abolished, allotting \$8,000 for the purpose.

These roads in Rutland and Holden were constructed over an extremely bad bottom for most of the distance, so that a stone foundation was necessary.

The roads in Holden and about $1\frac{3}{4}$ miles near Rutland village were built of macadam grouted with tar.

From Rutland through Holden and for about $1\frac{1}{2}$ miles in Worcester is a continuous State highway 10 miles in length, made of water-bound macadam with an oil surface or of bituminous macadam.

From Rutland to Athol the whole road has either been improved, as hereinbefore stated, or the contract has been let and the work is well under way, except for about 6,000 feet in Petersham, where the survey and preliminary report are already on file.

A good many miles of the older gravel roads will need surfacing, no doubt, but the whole route will be nearly completed and in reasonably good condition early in the summer of 1916.

No. 13.—From Worcester to Milford through Grafton and Upton to connect with a main highway to Cape Cod.

The Commission has already constructed about $3\frac{1}{2}$ miles of State highway in Grafton on the Worcester road, on its main line from Worcester to Providence via Northbridge, Uxbridge and Blackstone.

It has also constructed about $1\frac{1}{2}$ miles of State highway in Milford on this same route.

The town of Upton and the Commission have been co-operating under the "small town" act for several years in widening and improving the road in Upton from the Milford line westerly towards Upton. In 1912, 1913 and 1914 about $1\frac{1}{2}$ miles of road were so improved, the town having appropriated \$1,700 and the Commission having allotted \$3,100 for this work. A

gravel road was constructed, but it will undoubtedly need surfacing with some better materials when the traffic increases.

This year the town, the county and the Commission were going to continue the work on this line, and the Commission had allotted \$1,500 and the town and county \$1,500 for the work, but it was decided that it was better to wait until a careful survey could be made. The existing highway is very narrow and crooked, and extensive widenings would have to be made; also in some places the road probably would have to be relocated.

It was evident that it would require considerable time before the necessary surveys could be made, hearings held, and a new layout made by the county commissioners of Worcester County, so it seemed best to retain the money until such time as a proper location could be secured.

The road from West Upton to Grafton Center presented no such difficulties, so it was determined to proceed at once to construct that section of the road. A contract was let for the construction of about 5 miles of road, the towns assuming all land and grade damages.

The Commission allotted \$50,000 for this construction, and is building a road 18 feet in width, with a surface of crushed gravel heated and thoroughly mixed with a hot asphaltic product, except where the grades are too steep, and on these a broken stone road will be constructed grouted with a mixture of hot sand and hot tar, to provide as good a footing as possible.

These surfaces will be put upon broken stone base, well rolled, and with a suitable foundation wherever necessary. The work has been started and the rough grading has been completed for at least one-half of the entire distance. This part of the road will be completed as early in the year as possible.

A survey of the balance of the road from Upton to the Milford line has been ordered, and more than one-half of the line has been surveyed; and it is expected that the necessary layout can be made early in the year and the work of construction started.

No. 14.—From Warwick to Orange to connect with main highway.

In Orange there are about $1\frac{1}{2}$ miles of road. It has all been

surveyed, and a contract has been let to the town for the construction of over 4,000 feet on the southerly end. About one-half mile has already been graded and has had gravel put upon the surface. This work will be continued early in the spring.

In Warwick there are about $4\frac{3}{4}$ miles. Over $1\frac{1}{2}$ miles of this road have been constructed by the Commission and the town, from 1904 to 1911, under the "small town" act. Most of this road will need resurfacing. In 1915, 700 feet more were graded and drained, but will need surfacing. A survey will be made of the balance of the road.

No. 15.—From Blandford to Woronoco in Russell to connect with the main highway, about 3 miles.

A contract has been let, and the construction work was started and continued until winter set in.

Five small concrete bridges have been built, and most of the culverts have been put in, and a portion of the road has been graded. A macadam road is being constructed and is to be coated with light asphaltic oil. This road will be completed early next season.

No. 16.—From the State highway in Wales, southerly to the Connecticut State Line, 4 miles.

About $1\frac{1}{4}$ miles of State highway were built nearly fourteen years ago between Brimfield and Wales. It is about 4 miles from the end of this highway to the Connecticut State line. This road will be surveyed and the construction commenced as soon as possible.

The Commission felt that, as it had not enough engineers to make all the surveys this year, it was better to continue construction on the most important through lines where work was already in progress, and could proceed continuously if the surveys were made, rather than to start on less important routes where the work could not be done at once, and where new locations might be needed.

No. 17.—From West Chester to Chesterfield to Williamsburg; also, from the Williamsburg line over Mains Hill to a point at or near the village of Florence in Northampton, not exceeding 2 miles.

It is over 8 miles from West Chesterfield to the State highway in Williamsburg. Over 2 miles of this road in Chester-

field have been improved under the "small town" act and with motor vehicle fees, and nearly 1 mile has been improved in Williamsburg.

Work is being done in both towns, and a gravel road is being constructed upon a stone foundation. About three-quarters of a mile has already been constructed in Chesterfield, and over three-quarters of a mile has been constructed in Williamsburg, and the work will be continued in the spring.

From the end of this road through Williamsburg to the Northampton line the whole road has been constructed, a part being State highway and the rest of the road having been constructed by the town and the Commission under the "small town" act and with motor vehicle fees at the joint expense of the town and the Commission.

It is about $1\frac{1}{2}$ miles from the Williamsburg line to the village of Florence in Northampton over Mains Hill. The highway over Mains Hill has been in very poor condition, especially in the spring, because the soil is wet and clayey.

The survey has been completed and a contract for the construction of the road will be let early in the spring. A foundation will undoubtedly be necessary on practically the entire length of the road, and the grades will be improved as much as they reasonably can be.

From the above statements as to what has been done on each of the seventeen routes, it will be seen that a good deal has already been done this year, and that surveys have been made so that a very large amount of work can be done next season if labor conditions do not prevent.

In many of the small towns, where there was any one in the town who was competent to do the work under proper instruction and supervision, the Commission has deemed it wise to have the work done by the town and to have as much local labor and as many local teams used as possible. In many cases the work has been of great benefit to the townspeople, especially as in many places in the middle and western part of the State the crops were greatly injured and were often destroyed by the wet weather and by what were practically cloudbursts.

The local superintendent and the town laborers are taught, by doing the work under expert direction and supervision, how

to build a road, how it should be graded and drained, when a foundation is needed, and, generally, how to organize the work properly to the best advantage, and how to use the materials so as to produce a good road.

This will be of great value to the town and to all people using the highways, because the town roads will in the future be constructed in a better manner.

On the more important routes where it seemed wise to have longer stretches of road built and to have the route completed as soon as possible, the Commission has usually advertised and let a contract for the construction of the road.

GUIDE BOARDS — MARKING OF ROUTES.

Color Scheme.

Last year the Commission suggested to the Legislature that \$5,000 should be appropriated to be used in erecting suitable guide boards at important places on certain main routes. No appropriation was made; consequently the guide boards were not erected.

Marking Routes by Colored Bands.

The Commission had been consulting with the State authorities in the neighboring States as to the desirability of adopting some uniform or similar scheme of marking all main routes. In three of these States a few routes had already been marked by bands of different colors on posts, poles, etc., to note the particular route. There was, however, no systematic and uniform method.

After experimenting with a number of the different possible schemes, it seemed to the Commission that the simplest plan of all would be to adopt certain colors for certain main routes, according to the direction in which the route ran.

It was decided to adopt a band of red to mark all main routes running east and west, a band of blue to indicate all main routes running north and south, and a band of yellow to indicate all secondary or diagonal routes. Where two routes crossed each other, bands of both colors were to be used on each post at the junction. If three routes intersected, all three colors were used.

Where two routes follow the same road for a distance, bands of both colors are put on the posts. The engineers were directed to have a band about 6 inches in width painted on two or three posts or poles on each side of each street corner or intersection. If the route turns a corner, the bands show on the posts beyond the turning, and there are no bands beyond on the road that the route diverts from. In a few places for short distances three routes will follow one road.

This systematic scheme seemed very simple and practical, and it was decided to put it in operation.

The Commission wrote to the State authorities in charge of the State highways in New York, Connecticut, Rhode Island, Maine, New Hampshire and Vermont, explaining the scheme and enclosing a map showing the interstate routes that were to be marked in this manner. All the authorities in all these States expressed their approval of this particular scheme, and their willingness to co-operate.

In Vermont and New Hampshire certain routes had already been marked by colored bands which they did not wish to change,—in Vermont because the colors indicated from what funds the road was built and who was responsible for its maintenance, and in New Hampshire because they had published a map, the routes which were marked being printed in the same color that was painted on the posts.

In Maine, Rhode Island, Connecticut and New York they agreed to adopt the same color scheme that was in use in Massachusetts.

Where the Massachusetts main routes connect with main routes in New Hampshire and Vermont, the engineers were directed to have bands painted below the bands that were painted on the posts in those States, and that Massachusetts colors should be painted on a number of posts beyond the line. At the same time the Commission painted a number of posts in Massachusetts with bands of the same colors that had been used over the line in New Hampshire and Vermont. This clearly indicates to the tourist that the routes are identical and what color he should follow to continue on the route.

In a number of the larger towns and cities, it was possible to mark a route that would keep the tourist away from the con-

gested streets and the center, and also secure him a better road, less delay, and, more important, would greatly lessen the possibility of accidents.

Main Routes marked.

Red bands were used to indicate the main routes east and west. On a number of posts a narrow margin of white was painted above and below the color. This made the color much more conspicuous, and will probably be used everywhere next year.

Main Routes, East and West — Red Routes.

Boston, Worcester, Springfield, Pittsfield, Albany, N. Y.

Boston, Concord, Ayer, Fitchburg, Greenfield, North Adams, Williamstown, and so on to Troy, N. Y.

Newburyport to Haverhill on the south side of the Merrimac.

Lowell, Lawrence, Haverhill, Salisbury to the beach (a route that will be red when it is completed).

Boston to Plymouth, Sandwich, and the north side of the Cape to Provincetown.

Providence, Fall River, New Bedford, Wareham, here joining a blue route on the south side of the Cape to Falmouth, Barnstable, Dennis, Chatham to Orleans, where it joins the red route to Provincetown in one direction and to Boston and Plymouth in the other.

Main Routes, North and South — Blue Routes.

Boston to New Hampshire and Maine via Lynn, Salem, Ipswich and Newburyport.

Boston to Newburyport via the turnpike.

Boston to Haverhill via Reading and North Andover.

Boston to Lowell, Nashua and Concord, N. H., via Woburn.

Boston to Brockton, Middleborough, Wareham and all points on the south shore of Cape Cod.

Boston to Providence, R. I., via Dedham, Wrentham and North Attleborough.

Fitchburg, via Worcester and Webster, to Putnam and New London, Conn.

Brattleboro, Vt., via Greenfield, Northampton, Holyoke, Springfield, to Hartford, Conn.

Bennington, Vt., via North Adams, Pittsfield, Great Barrington, to New York.

Secondary Routes — Yellow.

Pittsfield to Northampton via Dalton and Goshen.

Worcester to Athol via Rutland and Barre.

Fitchburg to Keene, N. H., via Ashburnham and Winchendon, to Fitzwilliam, N. H.

Worcester to Providence via Northbridge, Blackstone, Woonsocket, R. I.

Littleton to Lowell via Westford and Chelmsford.

Lawrence to Salem via Middleton.

Certain other routes may be marked in the future, but the Commission believes that only a few main routes should be marked. Too many marks would cause confusion.

AUTOMOBILE DEPARTMENT.

Fees.

During the year 1915, 102,633 automobiles and 9,520 motor cycles were registered, as against 77,246 automobiles and 8,161 motor cycles registered in 1914. In addition to the foregoing there were 1,742 manufacturers' and dealers' registration certificates issued in 1915, including 29 motor cycle dealers.

The amount of fees collected for automobiles was \$973,100.50, or an average of \$9.48 for each automobile, the average fee collected in 1914 being \$9.77.

For the 1,742 manufacturers' and dealers' registrations, \$50,686.50 was collected. The fees collected for the registration of motor cycles amounted to \$18,258, and the fees collected for operators' licenses, examinations and sundries amounted to \$158,351.50.

During the year, 35,623 operators' licenses were issued, and 63,576 operators' licenses were renewed. The number of chauffeurs' licenses issued was 9,033, and the number of chauffeurs' renewals issued was 25,703. There are, therefore, 133,935 persons licensed to operate automobiles in this State, an increase of 34,403 over 1914.

The total amount collected from registration fees, license fees, sundry receipts, interest, etc., was \$1,205,420.19, an increase of \$279,455.44 over the amount collected in 1914. From this amount had to be paid the cost of number plates, salaries of clerks, investigators, examiners, etc., in the automobile department, as well as many other expenses, rebates, etc.

Eighty per cent. of the balance of the money is by law available for the maintenance and repair of State highways, and 20 per cent. is available for the repair, improvement and construction of roads on through routes in towns, under the provisions of chapter 525 of the Acts of 1910.

For further details relating to registrations, licenses, fees, etc., see Appendix A.

Examinations for Licenses.

The examiners of the Commission held 10,496 examinations during the fiscal year 1915. This was an increase of 3,037 over the preceding year.

Of the 7,366 persons examined, 6,733 finally succeeded in passing the examinations and 633 failed; while in 1914, 5,659 persons were examined, 724 of whom failed to pass. Almost all of the failures were on the road test. The fact that 633 of the persons examined could not pass the examination on the road test shows the unfitness of the applicants. The examination is entirely fair and practical, and the road test required is not unduly severe. It consists merely of operating the car under ordinary traffic conditions.

Automobile Accidents and Investigations.

The following table shows the accidents resulting in personal injuries, in which automobiles have been involved, and of which the Commission had notice, for the fiscal years of 1914 and 1915:—

	1914.	1915.
Total number killed,	229	294
Total number injured,	4,010	6,197
	<hr/>	<hr/>
Total number accidents,	4,239	6,491

About 75 per cent. of these accidents occurred in the day-time, and 25 per cent. after dark. Three times as many people were killed and injured in city streets as on the country roads. There were 65 more fatal accidents in 1915 than in 1914, an increase of nearly 29 per cent., while during the same period the number of automobiles registered increased 31 per cent. In compiling the above, the Commission has included only the accidents in which some person was killed or injured.

Chapter 530 of the Acts of the year 1913 requires the operators of all cars involved in accidents, resulting in the injury of persons or property, to report the same to the Commission. Over 11,000 such reports were received this year. Most of the accidents reported are of a trivial nature, and many accidents were reported both by the operators and other persons, causing a duplication of reports. It seemed best, therefore, to include in the list only the accidents of a serious nature, so that some fair comparison can be made with other years and with accidents from other causes.

Street Railway Accidents.

In considering whether automobiles are unduly dangerous to the traveling public, accidents caused by other vehicles should be considered. Unfortunately, the accidents from teams are not reported, except in a few cities. Street railway accidents are, however, in the report of the Public Service Commission, and the following statement shows the relative number of accidents in which street railway cars and motor vehicles were involved, the street railway figures being for the year ending June 30, 1915:—

	Street Cars.	Automobiles.
Total number killed,	85	294
Total number injured,	8,403	6,197
Total number killed or injured,	8,488	6,491
Occupants of cars or employees killed,	32	99
Other persons killed,	53	195
Occupants of cars or employees injured,	6,958	2,157
Other persons injured,	1,445	4,040

In this connection it should be remembered that the street railway cars run upon tracks and often upon locations which

are for their exclusive use. Notwithstanding that, nearly twice as many people were killed and injured in street railway accidents as in accidents where automobiles were involved.

A fairer comparison would be by the mileage covered by each class of transportation. Such a comparison can be made only by estimating the mileage traveled by automobiles. Any computation made on assuming an ordinary mileage for automobiles and taking the actual mileage of the street railways will show that the motor vehicle runs several times as many miles as the street car does before it either kills or injures anyone.

There are about 8,300 street railway cars operated in the State, and they average about 16,000 miles a year each. There are 111,343 automobiles and motor trucks registered in Massachusetts this year, allowing only 5 automobiles for each dealer, and a few dealers have fifty or more number plates each. There were 9,520 motor cycles registered, and the accidents caused by these motor cycles are included in the above tables. This makes a total of over 120,000 motor vehicles that are using our highways. Besides these there are at least 25,000 more motor vehicles coming from other States that are using our roads.

Considering only accidents to persons who were not passengers, 8,300 electric cars killed or injured 1,498 persons, and 140,000 motor vehicles killed or injured 4,235. Some person, who was not a passenger, was killed or injured for every 6 electric cars that were operated, whereas 33 motor vehicles were registered for each outsider killed or injured.

If each motor vehicle were operated 5,000 miles during the year, it traveled on the average over 100,000 miles before any person was killed or injured. Some person was either killed or injured for every 16,000 miles that a street car was operated. An automobile traveled six times as many miles as an electric car traveled before any person was either killed or injured.

According to the above table, furnished by the Public Service Commission, there were 32 fewer people killed by electric cars in 1915 than in 1914, while at the same time while there were 1,700 fewer cars operated, they were operated 3,000 miles

more each than in 1914, so the total mileage operated was decreased only 3 per cent. There were fewer people killed but more were injured, although the cars were operated fewer miles.

The number of automobiles increased more in proportion than the number of people killed, but here again the number of people injured increased more than the motor vehicles did proportionately.

A large part, if not all, of this increase may be because the accidents tabulated until a year or two ago were only those that were serious enough to be mentioned in the papers or reported by the police. For the last few years the law has required all accidents to be reported, and in consequence many trivial ones are reported and are included in the figures given.

Accidents in the Streets of Boston.

In connection with the accidents reported from all over the State in which motor vehicles were involved, it is interesting to note what has occurred in the streets of the city of Boston, where a complete record is kept, as the results in that city are a fair criterion for what has occurred elsewhere in the cities and villages of the State.

The number of automobiles and trucks registered in this State has increased from 77,246, in 1914, to 102,633, in 1915, an increase of over 32 per cent.

The police commissioner of the city of Boston publishes in his report the record made by that department of all the accidents which occur in the streets of Boston. As this record is practically complete and certainly impartial, it is of interest in connection with the accidents in which motor vehicles are involved to consider other accidents in the streets as well, and the relative traffic.

There were in the streets of Boston during the last tabulated year a total of 110 persons killed and 2,708 injured as a result of various accidents; 68 of the deaths and 1,642 of the injuries were due to traffic of various kinds; 42 deaths and 1,066 injuries were due to other causes, the largest number of which (33 deaths and 839 injuries) were due to falls on the sidewalk, from buildings, etc.

The following are the deaths and injuries caused by accidents due to traffic: —

	1914.		1915.	
	Deaths.	Injuries.	Deaths.	Injuries.
Teams, bicycles, etc.,	19	522	14	405
Street cars,	16	447	8	373
Motor vehicles,	28	649	45	852
Motor cycles,	1	10	1	12

Motor vehicles were therefore responsible for the first time for causing more deaths and injuries in the streets than were caused by street cars and teams.

In this connection it should be noted that there has been a tremendous increase in the use of motor vehicles in the city during the winter months. Many times as many automobiles are now used all the year round as were used only a few years ago, and this naturally increased the number of accidents.

The traffic census taken this year, which is printed elsewhere in this report, shows that on many of the roads in and around Boston, especially in the parkways, motor vehicles constitute 90 to 99 per cent. of the traffic, and that the number of horse-drawn vehicles using the roads is rapidly decreasing.

Taking the State as a whole the increase in the number of fatal accidents caused by motor vehicles has not been as great as the increase in the number of motor vehicles registered. The fatal accidents increased 28 per cent., and the motor vehicles registered increased over 32 per cent.

Court Abstracts.

During the year 1915, 7,260 abstracts of court records were received from the courts, as against 5,491 in 1914. These came from 85 courts of the Commonwealth.

The abstracts show that 6,522 persons were convicted of violations of the automobile law; 278 were found not guilty, 617 cases were appealed, 1,842 complaints were placed on file, and 303 were nol prossed. In 50 cases the defendants were de-

faulted, and in 52 they were committed to imprisonment. The complaints were as follows:—

For manslaughter,	15
For overspeeding,	2,506
For reckless operating,	150
For operating while intoxicated,	288
For using automobile without authority,	130
For endangering the lives and safety of the public,	112
For failing to stop after causing injury,	48
For improper display or no register number,	185
For operating without a license,	731
For operating without carrying registration certificates,	185
For operating an unregistered motor vehicle,	94
For refusing to stop when signaled by officer,	171
For operating with unlighted lamps,	356
For violations of park rules,	156
For failing to give signal when approaching intersecting way,	1,455
For miscellaneous offences,	983

The abstracts show that \$41,474 were imposed as fines, \$713 for violations of the metropolitan park rules and \$2,021.65 for costs of court.

Special Regulations.

The Commission's reports for the years 1912 and 1913 contain synopses of the special regulations in effect throughout the State. The only regulation approved by the Commission since 1913 is the following, which was made by the city authorities of Worcester on July 6, 1915, and approved by the Commission on Aug. 4, 1915:—

No person shall operate a motor vehicle nor shall the owner of such vehicle permit it to be operated on the driveway on the south side of Shrewsbury Street, in either direction, from the point of intersection of the southerly line of said street with the northerly line of East Worcester Street to the point of intersection of the southerly line of said Shrewsbury Street with the westerly line of Warden Street, except in crossing said Shrewsbury Street to or from a street intersecting said Shrewsbury Street, in which case the crossing place nearest such intersecting street must be used; or in going from the driveway on the north side of said Shrewsbury Street to a building on said south driveway or from such building to said north driveway, in which case the crossing place nearest such building must be used; or in going to a building on said south driveway from a street intersecting said driveway or from such building to such intersecting

street. Any person who violates the foregoing order shall be punished by a fine of not less than \$10 nor more than \$25 for the first offence, and not less than \$25 nor more than \$50 for a second offence and not less than \$50 nor more than \$100 for subsequent offences committed during any period of twelve months.

Automobile Hearings.

These hearings are held either upon complaints or as a result of investigations made by the Commission's investigators, or at the request of the operators whose licenses have been suspended or revoked. Such hearings have occupied the entire day on Wednesday of each week, and often other days in the week as well. During the past year the Commission held 432 such public hearings, the number in 1914 being 308.

In addition to these the Commission receives every week a large number of reports of investigations made by its inspectors. These are read and acted upon. There were 1,279 such reports made in 1915, as against 1,226 in 1914. In 1915 the Commission's investigators prosecuted 74 operators in the courts.

During the year 31 operators or chauffeurs were placed on probation by the Board, and were required to report regularly for a certain period, at intervals of a month or so, to some particular officer. Of the persons so placed on probation, 21 reported regularly, and 10 had their licenses taken away for failure to keep the terms of their probation.

Examination of Garage Records.

During the year inspections were made of 304 garages and dealers' places of business to ascertain if they were complying with the law. Where violations of the law were reported by the inspectors, cautionary letters were written if the neglect appeared to be accidental; in the more serious cases some were prosecuted in court; and in some instances, the proprietors were summoned before the Commission to show cause why their licenses to operate or their registration certificates should not be suspended or revoked.

Suspension and Revocation of Licenses.

The following summary shows the action taken by the Commission in the various cases in 1914 and 1915, and the causes of said action:—

Action taken on Formal Complaints after Hearing.

		1914.	1915.
Licenses revoked,	.	1	—
Licenses suspended,	.	26	31
Registration certificate suspended,	.	1	1
Complaints placed on file,	.	11	14
Complaints dismissed,	.	9	13
Operators cautioned,	.	16	3
Total hearings on formal complaints,	.	64	62

Suspensions and Revocations.

Licenses revoked,	.	231	303
Licenses suspended,	.	521	615
Rights to operate in Massachusetts suspended,	.	34	181
Registration certificates suspended or revoked,	.	2	5
Registration certificates canceled,	.	1	—
Motor cycle registration certificates revoked,	.	19	6
Motor cycle registration certificates suspended,	.	42	2
Dealers' registration certificates suspended,	.	4	—
Dealers' registration certificates revoked,	.	4	4
Dealers' registration certificates canceled,	.	—	37
Total suspensions and revocations,	.	858	1,153

Suspensions and revocations resulting from court convictions,

294 454

Suspensions and revocations after hearings on formal complaints,

28 32

Suspensions and revocations after investigation, on which hearings were given in some cases,

536 667

— —

Causes of Suspensions and Revocations.

Reckless operation,	.	142	167
Operating while under influence of intoxicating liquor,	.	131	202
Refusing or neglecting to stop after accident,	.	22	41
Accidents resulting in death,	.	223	299
Improper operation,	.	155	184
Three overspeeding convictions,	.	1	4
Operating auto without owner's permission,	.	21	74
Improper person,	.	80	115
Other offences,	.	83	67
		— —	
		858	1,153

Deaths.

In 1915 there were 284 fatal accidents in Massachusetts in which motor vehicles were involved, causing 294 deaths. There were 15 accidents in other States in which Massachusetts operators were involved, causing 15 deaths. Four of these deaths occurred in New Hampshire, 2 in Vermont, 6 in Rhode Island, 2 in Connecticut and 1 in New York. These accidents were investigated because Massachusetts operators were involved, the total number of such operators being 310.

The fatal accidents were disposed of as follows, the figures for 1914 being also given:—

	1914.	1915.
Licenses revoked,	39	69
Motor cycle registration certificates revoked,	1	1
Licenses suspended, and reinstated after investigation and hearing,	95	120
Motor cycle registration certificates suspended, and reinstated after investigation and hearing,	9	1
Licenses suspended, final hearings pending,	24	45
Motor cycle registration certificates suspended, final hearings pending,	2	—
Rights to operate in Massachusetts suspended and, after investigation, serious fault found,	6	18
Rights to operate in Massachusetts suspended, and reinstated,	3	11
No action, because operator had no Massachusetts license or registration certificate,	3	2
No action, because operator was unknown,	—	8
No action, because of death of operator,	43	35
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	225	310

Suspension and Revocation of Licenses to operate Motor Vehicles in Massachusetts.

Massachusetts has constantly employed investigators and examiners. All fatal accidents where motor vehicles are involved have to be investigated by law, and in addition to these as many of the more serious accidents as possible are investigated, where it appears as if the operator may have been operating improperly.

Also, very often there seems some doubt as to whether a

certain operator is a proper person to hold a license, for some reason; for instance, that he operates recklessly, or that he is a drinking man, etc. These matters are investigated and reported on.

In Massachusetts the law requires the Commission to suspend or revoke the license of an operator of a motor vehicle whenever such an operator is convicted in court of any of the more serious offences, as, for instance, operating, under the influence of liquor, recklessly, so as to endanger the public, going away after an accident without stopping and making himself known, etc. When a fatal accident occurs, the license of the operator has by law to be suspended, and must be revoked, unless after an investigation or upon a hearing the Commission finds affirmatively that the accident happened without fault upon the part of the operator.

The Commission also has authority to suspend the license of any operator or the right of any person to operate whether a citizen of this State or of another State whenever, in its opinion, such person is an improper person to operate or is operating improperly.

During the year 1913, the licenses of 608 operators or chauffeurs were suspended or revoked by the Commission. In 1914 the licenses of 858 operators or chauffeurs were suspended or revoked, and the right of 34 persons to operate motor vehicles in Massachusetts was suspended until they secured a license.

In 1915 the licenses of 972 operators or chauffeurs were suspended or revoked, and the right of 181 persons to operate motor vehicles in this State was suspended until they secured a license.

The Commission felt, however, that it perhaps might benefit by the experience of other motor vehicle departments in other States, and by finding out what was being done in those States.

Licenses suspended or revoked in Other States.

The Commission consequently sent a letter of inquiry asking certain questions of the State official or department that had charge of licensing the operators of motor vehicles and the registration of the same. These letters were sent to the following states: California, Connecticut, Delaware, Illinois,

Maine, Maryland, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island and Vermont.

The questions asked were as follows:—

1. How many licenses or car registrations in your State have been suspended or revoked, and for what causes? (I should be glad to have this for the last three years if you have it.)
2. In your State does the officer in charge of licensing operators of motor vehicles have any duty in regard to investigating accidents and suspending or revoking the licenses of the operators that he has found to be in fault or to be improper persons to operate?
3. If there is a provision for this, how many investigators are there, and what duties do they perform?
4. Is there any provision in the laws of your State which requires either the license of the operator or the registration of the car to be suspended or revoked if the operator is convicted of any offence against the law; as, for instance, operating under the influence of intoxicating liquor, or recklessly, or so as to endanger the public, or if any person is fatally injured, etc.?
5. If you have not answered this in your above replies, can you tell me if there is any way in which the license of the operator is suspended or revoked, or can be, in your State, and, if so, by what method and by whom?

A short summary of the replies received is interesting, as it shows what is being done in some of the other States to make the highways safer and to keep the drunken or reckless operator off of the roads. It also furnishes the data which can be compared with what is being done in Massachusetts with the same object in view.

California. — 1. During the last three years there have probably been about 25 licenses revoked, such revocations being caused on account of intoxication and reckless driving.

2. The matter is left largely with the local authorities, whose duty it is to receive complaints and act upon them. The motor vehicle department has authority to suspend or revoke licenses; its power is very limited as it has no power to summon witnesses.

3. We have two field deputies whose duty it is to see that the State law is complied with.

4. The law has a provision that the operator's license may be suspended or revoked for such offences (reckless opera-

tion, while intoxicated) though it is not a requirement which is essential. There is usually a fine imposed.

5. The license may be suspended by the judge, proper cause for such step being given.

Connecticut. — In 1913 there were 147 suspensions and revocations, 70 of which were death cases. In 1914 there were 176, of which 89 were death cases, and to date (November 13), 314 licenses have been suspended or revoked, of which 105 are on account of deaths. Very few licenses have been permanently revoked.

In a majority of the death cases the coroner exonerates the operator, so the majority of these licenses are promptly returned as we are largely guided by the coroner's finding.

The secretary may call upon the State police for assistance in investigating accidents, etc., and one officer at least may be assigned to constant duty.

The secretary has power to suspend or revoke licenses in his discretion, and the law requires him to revoke the license of any person whose license has been once suspended if he is subsequently convicted of any offence stated, as operating under the influence of liquor, in a race, etc.

Delaware. — During 1915, 7 operators' licenses have been revoked; cause, intoxication.

There are no investigators.

The Secretary of State is authorized to revoke the license of any operator operating a car under the influence of intoxicating liquor.

Illinois. — The law provides that only in case of conviction of a second violation of the law may the automobile license be revoked.

The records fail to show that any licenses for the past three years have been revoked.

There are no investigators connected with the motor department.

A chauffeur's license may not be renewed if it is shown to the satisfaction of the Secretary of State that a chauffeur shall have operated under the influence of intoxicating liquor.

Maryland. — During the past three years 132 operators' and chauffeurs' licenses have been suspended or revoked.

There is one deputy who assists in investigating violations of the automobile law.

The law requires the courts to send records of convictions for violations of the motor vehicle law to the commissioner.

The commissioner has the power, after hearing, to suspend or revoke the license of an operator. A right of appeal to the Governor is given, his decision being final.

New Hampshire. — The commissioner has authority to suspend or revoke licenses, but usually depends on the courts.

He is required to revoke the license when an operator is convicted in court of the more serious offences, these being the same as in Massachusetts.

In 1913, 25 operators were convicted in court of various offences. In 1914, 82 operators were so convicted, and in 1915, 262 operators were convicted of various offences against the motor vehicle law.

Forty-two of these convictions were for "intoxicating liquor;" 13 for operating recklessly; 14 for operating unreasonably; 99 for excessive speed. The others were for lack of papers, numbers, etc.

New York. — The Secretary of State is authorized to suspend or revoke a certificate of registration issued to owners of motor cars and licenses issued to chauffeurs in the three following instances, and then only upon recommendation of the trial court: (a) for leaving after causing injury to persons or property without giving name; (b) for operating a car while intoxicated; (c) for the third conviction of a chauffeur for speeding.

Since 1910 only 130 convictions have been certified to the office, and only 49 of these offenders were found to be registered as owners of cars or chauffeurs and therefore had their certificates revoked.

There are no investigators appointed to investigate accidents, though five are employed to see that motor cars are properly registered, etc.

Only persons who operate for hire require a license in New York State; any other person, be he owner or borrower, can operate without a license.

Ohio. — Apparently from the reply received, no operators'

licenses have been suspended or revoked, and the department is not seeking to enforce the provisions of the law because the common pleas court in one county has held the law unconstitutional and the case is pending on appeal.

The law makes it a misdemeanor for any person to operate a motor vehicle on a highway while in a state of intoxication.

The law also provides that when a chauffeur is convicted a second time for certain offences, (1) operating at an unreasonable speed or so as to endanger any person or property, (2) breaks the speed limit (in excess of 8, 15 and 20 miles an hour), (3) or does not stop when signaled or refuses to make himself known after an accident, said chauffeur shall upon conviction for a second offence be suspended from the right to operate for thirty days, and for a third offence shall be so suspended for not less than one year.

Pennsylvania. — From 1906 to date (Nov. 15, 1915) 20 licenses have been revoked, — 13 of which were registrations, 6 drivers' licenses and 1 dealer's license.

The department is not authorized to investigate accidents; the commissioner, however, has power to revoke licenses. The enforcement is left to the local authorities to call particular cases to the attention of the department when warnings are sent out; upon further complaint hearings are held.

When a person is operating in an intoxicated condition or in a reckless manner and has been convicted in court, and the case is brought to the attention of the department, the license is immediately suspended or revoked.

Rhode Island. — In 1912 there were 4 licenses revoked and 6 suspended, the chief causes being reckless driving and driving while intoxicated.

In 1913 there were 15 revocations and 11 suspensions for reckless driving, driving while intoxicated, failure to return to scene of accident.

In 1914 there were 38 revocations and 6 suspensions for driving while intoxicated, failure to return to scene of accident, operating cars without permission of owner.

The motor vehicle law of this State does not require investigation of accidents or the suspension or revocation of licenses, but does give the Board authority to revoke or suspend licenses.

There are no investigators connected with this department, there being no provision in the law which requires that licenses of operators of automobiles be suspended or revoked if the operator is convicted of any offence against the law. There is, however, a provision that such action may be taken by the Board. Such discretionary power, however, is limited to a conviction of a violation of certain portions of the law and does not cover a case where a person may be fatally injured.

Vermont. — During 1915, 64 licenses have been revoked; 36 of these were for operation under the influence of liquor, 26 for driving in a careless or negligent manner, and 2 for stealing cars.

There is one investigator engaged in investigation of violations of the automobile law, as nonregistration, nonlicensing, etc.

The investigation of accidents is left to the State's attorney of the county where the accident happened.

Michigan. — The law does not provide for revocation of licenses. All convictions of violations of the law are sent to the department of State, and those charged with enforcing the law are furnished copies of convictions, etc.

The department licensing has no power in investigating accidents, suspending or revoking licenses. They have no investigators.

There is no provision in their law requiring the license of an operator or the registration of a car to be suspended or revoked after conviction of an offence against the law; for instance, operating under the influence of liquor, recklessly, etc.; thinks a statute should provide for a suspension or revocation of a license for cause.

New Jersey. — In 1913, 85 licenses were revoked, 38 being summarily revoked by the commissioner, and 43 after trial; 2 licenses were suspended pending the outcome of criminal proceedings, and 2 were revoked by the local judges and sustained by the commissioner.

In 1914 there were 152 licenses revoked and 36 licenses suspended.

In 1915, 200 drivers' licenses have been revoked, including a number who did not have licenses and whose names were

placed on the black list. Twenty car registrations were revoked, also twelve motor cycle registrations. Twenty-four reciprocity privileges were suspended.

It is the duty of the officer in charge of licensing operators of motor vehicles "to attend to the enforcement of the provisions of the motor vehicle act." They have nineteen paid inspectors whose duty it is to report on all violations occurring in their respective districts.

Their law does not specifically state that a license must be revoked after conviction for violation of the law (for instance, driving while under the influence of liquor, or recklessly, etc.), but it is the practice of their department to always revoke the license of an operator who has been driving while intoxicated, in a majority of cases without hearing, though the defendant has the right to demand a hearing within five days after he has received the notice of revocation.

On complaints of reckless driving, a hearing is usually given.

Any one who drives after his license has been revoked is liable to a charge of misdemeanor.

The magistrates throughout the State are required to send reports of all cases of violation of the motor vehicle act heard before them, and the department often considers their reports as sufficient basis for action in summarily revoking licenses in aggravated cases.

Comparison, Massachusetts and Thirteen Other States.

In these thirteen States, 960 licenses have been suspended or revoked according to the record that in several States covers a period of from three to nine years, though in some States only one year is included.

In Massachusetts 1,153 licenses and rights to operate have been suspended or revoked in the last twelve months.

Practically no other State has any investigators who investigate accidents, though one State uses a member of the State police force, and in another the law officers do investigate sometimes. Practically, however, the decision is left entirely to the courts upon a criminal complaint in other States, whereas in Massachusetts our investigators investigate all death cases and many others.

Often an operator's license is revoked by the Commission, when he is not held by the criminal court for manslaughter or other offence, because the investigation shows the operator to have been in fault, though usually he was not sufficiently negligent to warrant a conviction of manslaughter.

Twelve hundred and seventy-nine cases were investigated in Massachusetts during the last twelve months, many times as many investigations as were made in all the other thirteen States put together.

Surely Massachusetts is doing a good work in removing the drunken and reckless operator from the road and making our highways safer.

Causes of Automobile Accidents.

With the large number of accidents that are occurring on our highways, not only where motor vehicles are involved but also horse-drawn vehicles, electric cars, etc., it would be manifestly impossible to secure sufficient information to determine the causes of accidents, how many were preventable and how many were quite unavoidable. The Commission felt, however, that the subject was worthy of considerable study.

When there is a fatal accident in which a motor vehicle is involved, the law requires this Commission to suspend the license of the operator, have an investigation made of the accident, and to revoke the license of the operator unless the Commission finds affirmatively that the accident happened without serious fault on his part.

The interpretation that the Commission has put upon the term "without serious fault" has been a very strict one so far as the operator is concerned; to wit, if the operator was at fault, was operating too fast or not paying sufficient attention for an instant, etc., and could or should have prevented the accident by slowing up or stopping in time, the Commission has invariably found the operator at fault, although the person injured, the pedestrian, team driver, bicyclist, or other user of the highway may have been equally or often more at fault.

For the purpose of determining as far as possible the causes of accidents, the Commission took the reports of its investigators in over 100 cases and analyzed them carefully to find out where the accident happened, and, as far as possible, why

the accident happened. It seemed as if the analysis of these accidents would prove a pretty fair criterion by which to judge the others. The reading of these investigators' reports was naturally quite a long task, but the results were found to be as follows:—

Fifty-nine of these accidents occurred in the daytime, and 42 in the dusk or after dark; 37 of them occurred on country roads, and 64 in city or town streets.

Private operators were involved in 40 accidents, chauffeurs in 36 accidents, and persons who held no license in this State in 17 accidents.

Of the 17 who held no licenses in this State, 8 were operators in other States and had a right to operate under the nonresident provisions of our automobile law. Three operators were learning to operate, the automobile being in charge of a licensed operator. In 7 accidents motor cycles were involved.

Automobiles were responsible for 75 of these accidents, trucks for 19, and motor cycles for 7.

Speed.

In the figures given below for speed, the Commission has not taken the estimate of the operator, but all the testimony in the case, especially of bystanders, and more particularly what actually occurred, as, for instance, within what distance the automobile was stopped.

In the accidents where the automobile was stated to be operating slowly, there was no question whatever that it was being operated at 12 miles or less an hour, often at only 5 or 6.

Those said to be operated at a "medium" rate of speed were going at a rate of 12 to 15 miles an hour and where there was no congestion of traffic and very few people on the streets.

Those called "too fast" were going at a rate of speed varying from 25 miles an hour to 40 miles an hour; in almost all of these cases the injury occurred to the occupants or operator of the cars themselves, there being only 1 case on a distinctly country road where any one was injured who was not in the vehicle.

The analysis showed that 46 of the motor vehicles were being operated slowly. These accidents were all in city or town streets.

In 30 cases the cars were being operated at a medium rate of speed, between 12 and 15 miles an hour.

In 21 cases the car was being operated too fast, and in 4 cases the cars were being operated at too great a rate of speed for the conditions that existed at that place. In these last cases the accidents happened where there were a number of people on the highway, and where the speed was too great for those particular places, though in none of them was it over 12 miles an hour.

Causes of Accidents to Pedestrians.

In 62 of these 101 cases, pedestrians were killed by motor vehicles. The Commission has carefully re-examined the evidence in these cases in order to ascertain what the cause of the accident was. In its opinion and in the opinion of its investigator, the operator of the motor vehicle was in fault in 26 of these cases, and his license or his right to operate has been revoked.

In 36 other accidents the operator was not to blame, because he was operating at a perfectly proper rate of speed and did everything possible to avoid an accident.

In no case was the operator held not at fault where he had a clear view, and the pedestrian on a city street walked 15 feet or more where he could or should have been seen before being hit, and in no case was the motor vehicle being operated in a street with many people or vehicles on it at 12 or more miles an hour.

Almost all these accidents happened in city streets (only 2 were on country roads).

There were 36 cases where the operator was held "not in fault." In 33 of these cases the pedestrian either stepped or ran out from behind another vehicle directly in front of a moving motor vehicle, that was so near that the operator had no chance to stop, or stepped back directly in front of the motor vehicle. In every case the operator actually stopped a length or less after the pedestrian came in sight. This shows conclusively that he was running slowly.

In one case a boy slipped under the back wheel; in another, a boy jumped from the back of a wagon directly in front of the

automobile; and in a third, a truck was turned off of the road by an obstruction that could not be seen in time, the operator's feet were thrown from the pedals, and the truck ran onto the sidewalk and killed a girl before it could be stopped.

Operators to blame and Licenses revoked.

In 26 cases where pedestrians were killed, the Board held the operator at fault, and his license was revoked or his right to operate was suspended.

In quite a number of these cases the pedestrian was also at fault because he started across the street without looking when a motor vehicle was very near, but the operator has been held in fault if he was running too fast under all the conditions, or didn't notice the pedestrian as soon as he should have seen him, or he didn't try to stop as soon as he observed him.

Altogether too many operators keep on going and expect the pedestrian to hear their horn and stop. They should always slow down and be ready to stop if necessary, especially when children are in sight. A child should always be expected to do the unexpected and wrong thing. Operators must always be prepared for this action.

The operator was held at fault in 20 of these accidents, because he was not paying proper attention and did not see the pedestrian as soon as he could have seen him, and therefore didn't put on his brake or turn in time to avoid the accident.

In 8 accidents the operator was at fault because he did not begin to stop as soon as he did see the pedestrian, but relied on the pedestrian's stopping.

Four operators were running too fast for the number of pedestrians on the road, and were operating too close to them. None of these operators were going over 12 or 15 miles an hour, but there were too many people around for any such speed.

In 5 cases after dark the automobile did not have sufficient light to show a pedestrian crossing the street until he was directly in front of the car, when it was too late to stop before the accident occurred.

In 2 cases only, where a pedestrian was injured, was there

any evidence that the operator might be inexperienced. One of these operators was examined and passed the examination easily; in the other case the operator will be examined before receiving another license.

In only 3 cases were pedestrians injured where automobiles were going faster than 20 miles an hour. All these accidents were on country roads; two of the cars were going from 25 to 30 miles an hour and one was going 33 to 35 miles an hour.

Occupants and Operators killed — Causes of Accidents.

There were 39 accidents where the occupants or operators of motor vehicles were killed. The operators were held at fault for 32 of these accidents and not in fault for 7. Eleven operators were killed, three of them being on motor cycles. Twenty-two occupants of cars were killed in these accidents.

In 19 cases the accident happened because of excessive speed. In 7 instances the operator lost control of his car, and it went off the road. Six were collisions between two motor vehicles; 3 were collisions with trains.

In 4 cases the operator was certainly under the influence of liquor, and in 6 other cases he had been drinking, and the witnesses disagreed as to whether he was drunk or not. In these 10 cases where the operator may have been under the influence of liquor, the accidents were of various character. In 4 they were collisions with other automobiles, in 1 with a railroad train, in 5 cases the automobile went off the road. In only 1 of these accidents was any one killed or seriously injured except the operator or occupants of the automobile driven by the drunken operator.

In 1 accident, a collision, one of the occupants of the other car was killed.

In 3 cases where the operator was not at fault, a helper riding on the truck fell off the side and under the rear wheel.

Two boys who were stealing rides fell under the back wheel and were killed, as was one boy who was trying to climb up the side of the truck.

One death was caused by a defective brake on a truck, and another by a broken radius rod on an automobile.

The Commission suspended the registration of the truck for a week until the brake was fixed. The automobile was destroyed.

One death was caused by a boy on a bicycle coming very fast from a side alleyway and running into the side of a truck.

Women Operators.

Among the 101 operators involved in these fatal accidents, there were three women. The Commission held two at fault, and one not at fault.

One of them had her car skid on a wet street and go onto the sidewalk and hit a man. She did not have sufficient control of her car and had only operated about 500 miles.

Another did not slow up enough when approaching a crossing, where her view was obstructed by a moving electric car, and she hit a woman standing on the street before she could stop.

The third was run into by a reckless man operator, when she was practically entirely across an intersecting street. He tried to cut ahead of her instead of slowing down, and hit the back wheel of her car.

Operators who did not stop.

There were four instances where the operators were unknown and they have not been caught yet. Three of these accidents were at night.

In one a bystander said that the operator didn't know of the accident. The rear of the automobile merely grazed the wheel of a pushcart. The injured man was standing up after the auto passed.

Another case was where a car was stolen and abandoned near Plum Island, Ipswich, and a man was found on the roadside. The owner of the car had notified the Boston police of the theft some hours before the accident.

In a third a child was run over in the daytime and no one could describe the automobile. It was only seen by a young child.

The fourth was a collision at night where a motor cycle collided with an automobile and the operator got away.

Recommendations for Legislation.

In general the Commission feels that the laws in this State governing the use of motor vehicles and the operation thereof are entirely adequate and are working satisfactorily.

The Commission has found in practice, however, that the law requiring that all applications for the registration of motor vehicles shall be sworn to by the applicant works a considerable hardship upon the persons who apply to register their cars, causing a great deal of delay and confusion, especially during the busy seasons of the year. The Commission has been unable to see any corresponding benefit that is secured.

Probably one-third of the applications received by mail have not been sworn to. The oath being required by law, all that can be done is to send the application back in order that it may be sworn to. This results in the applicant's having to wait, though he has paid his money and made his application in time, a few days or a week before he receives his number plates. Meantime, after the first day of January he is violating the law if he operates his car.

When applications are made at the office fully one-half of the applications lack the necessary oath, and a very considerable delay is caused by the time required to administer the oath. While the Commission has in its employ a number of justices of the peace who can administer the oath, the public is delayed.

More than 40,000 motor vehicles will have been registered this year prior to the tenth day of January, so that a very large number of the public will have been delayed and inconvenienced by this requirement of the law.

The Commission therefore recommends that the law requiring an application for the registration of a motor vehicle to be sworn to by the applicant be repealed.

EXPENDITURES.

The following is a summary of the expenditures of the Massachusetts Highway Commission from Dec. 1, 1914, to Nov. 30, 1915:—

CONSTRUCTION EXPENDITURES.

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$195 91	
Bourne,	15,184 27	
Brewster,	53 78	
Chatham,	50 34	
Dennis,	35 70	
Eastham,	402 97	
Harwich,	30 56	
Orleans,	7 04	
Sandwich,	11 84	
Truro,	11,541 00	
Wellfleet,	19,084 66	
Yarmouth,	34 05	
		\$46,632 12
<i>Berkshire County.</i>		
Becket,	\$6,049 33	
Cheshire,	9,098 76	
Clarksburg,	347 39	
Florida,	11,955 73	
Great Barrington,	55 50	
Hancock,	22 35	
Lanesborough,	39 70	
Lee,	41,120 28	
Lenox,	33 67	
North Adams,	11,426 59	
Pittsfield,	68 80	
Savoy,	18 75	
Sheffield,	18,149 98	
Stockbridge,	37 00	
Williamstown,	4 59	
Windsor,	6,036 96	
		104,465 38
<i>Bristol County.</i>		
Dartmouth,	\$25 00	
Dighton,	6,800 53	
Norton,	133 31	
Raynham,	9,733 22	
Somerset,	13,363 79	
Swansea,	6,202 16	
Taunton,	8,297 78	
		44,555 79
<i>Amount carried forward,</i>		\$195,653 29

CONSTRUCTION EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$195,653 29
<i>Dukes County.</i>		
Chilmark,	\$5,743 84	
Gay Head,	3,849 57	
Tisbury,	2 01	
West Tisbury,	29 83	
		9,625 25
<i>Essex County.</i>		
Danvers,	\$8,287 05	
Gloucester,	19,470 49	
Ipswich,	88 14	
Lawrence,	12,253 24	
Merrimac,	184 05	
Methuen,	14,946 77	
Middleton,	12,319 40	
Newbury,	205 19	
North Andover,	25,935 29	
Rowley,	388 30	
Salem,	27,813 75	
Salisbury,	10,290 45	
Saugus,	3,671 58	
		135,853 70
<i>Franklin County.</i>		
Bernardston,	\$15,962 09	
Buckland,	59 92	
Charlemont,	16,966 07	
Colrain,	5 20	
Deerfield,	747 90	
Erving,	2,651 94	
Greenfield,	1,763 03	
Montague,	108 95	
Northfield,	32 75	
Orange,	61 18	
Sunderland,	79 94	
Whately,	48 07	
		38,487 04
<i>Hampden County.</i>		
Holyoke,	\$0 47	
Palmer,	206 88	
Wilbraham,	32 48	
		239 83
<i>Hampshire County.</i>		
Amherst,	\$21,592 19	
Belchertown,	1,022 91	
Granby,	4,982 51	
Hadley,	96 55	
<i>Amounts carried forward,</i>	\$27,694 16	\$379,859 11

CONSTRUCTION EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$27,694 16	\$379,859 11
Hatfield,	33 53	
Northampton,	6,834 99	
South Hadley,	8 01	
		34,570 69
<i>Middlesex County.</i>		
Acton,	\$82 11	
Ashby,	10 75	
Ayer,	765 53	
Chelmsford,	27,795 09	
Concord,	97 29	
Groton,	326 47	
Lowell,	78 60	
Marlborough,	1,129 76	
North Reading,	10 37	
Pepperell,	6,084 46	
Reading,	1,397 22	
Shirley,	26,804 19	
Somerville,	12,512 73	
Stoneham,	50 28	
Tewksbury,	13 33	
Townsend,	5 60	
Tyngsborough,	141 99	
Watertown,	909 17	
Weston,	2 50	
Winchester,	278 29	
Woburn,	20 55	
		78,516 28
<i>Norfolk County.</i>		
Avon,	\$10,639 69	
Braintree,	5,399 89	
Cohasset,	169 54	
Dedham,	7,107 19	
Randolph,	31,755 54	
Stoughton,	12,125 63	
Weymouth,	3,661 17	
Wrentham,	28,782 86	
		99,641 51
<i>Plymouth County.</i>		
Abington,	\$6,748 24	
Brockton,	118 49	
Duxbury,	17,240 25	
Hingham,	7 63	
Lakeville,	97 28	
<i>Amounts carried forward,</i>	\$24,211 89	\$592,587 59

CONSTRUCTION EXPENDITURES — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$24,211 89	\$592,587 59
Marion,	218 53	
Marshfield,	130 35	
Pembroke,	21,266 89	
Plymouth,	4,032 83	
Rockland,	51 25	
Scituate,	73 40	
Wareham,	4,780 30	
Whitman,	4,113 28	
		58,878 72
<i>Suffolk County.</i>		
Revere, No.,	\$23 50	
		23 50
<i>Worcester County.</i>		
Athol,	\$2 00	
Blackstone,	517 66	
Brookfield,	35 15	
Charlton,	11,636 38	
Fitchburg,	19 39	
Gardner,	14 73	
Grafton,	12,874 24	
Holden,	16,279 05	
Leicester,	4 85	
Leominster,	7,226 33	
Lunenburg,	57 02	
Northborough,	89 09	
Northbridge,	15,189 81	
Oxford,	480 43	
Phillipston,	6 55	
Spencer,	43 80	
Sterling,	12,259 36	
Templeton,	18 23	
Uxbridge,	2,284 37	
Warren,	10 32	
West Boylston,	27,974 09	
West Brookfield,	485 08	
Westminster,	25 19	
		107,533 12
		\$759,022 93

EXPENDITURES UNDER "SMALL TOWN" ACTS.

[Chapter 47, Revised Laws, and Chapter 279, Acts of 1908.]

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Eastham,	\$971 72	
		\$971 72
<i>Berkshire County.</i>		
Alford,	\$598 00	
Becket,	3,366 32	
Cheshire,	634 96	
Clarksburg,	1,300 00	
Egremont,	801 92	
Florida,	743 35	
Hancock,	1,183 64	
Hinsdale,	3,985 18	
Lanesborough,	1,957 48	
Monterey,	835 22	
Mount Washington,	630 17	
New Ashford,	79 94	
New Marlborough,	545 40	
Otis,	1,448 02	
Peru,	1,052 27	
Richmond,	4,117 94	
Sandisfield,	933 12	
Savoy,	645 70	
Tyringham,	2,712 28	
Washington,	589 21	
West Stockbridge,	1,000 00	
		29,160 12
<i>Bristol County.</i>		
Berkley,	\$1,500 00	
Dighton,	1,500 00	
Mansfield,	2,500 00	
Rehoboth,	2,493 55	
Westport,	2,700 00	
		10,693 55
<i>Essex County.</i>		
Lynnfield,	\$1,000 00	
Methuen,	500 00	
Middleton,	500 00	
North Andover,	400 00	
West Newbury,	1,200 00	
		3,600 00
<i>Franklin County.</i>		
Ashfield,	\$2,894 10	
Buckland,	490 47	
Charlemont,	2,065 08	
Colrain,	2,305 70	
Conway,	1,500 00	
<i>Amounts carried forward,</i>	\$9,255 35	\$44,425 39

EXPENDITURES UNDER "SMALL TOWN" ACTS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$9,255 35	\$44,425 39
Gill,	700 00	
Hawley,	700 00	
Heath,	524 61	
Leverett,	1,100 00	
Monroe,	1,000 00	
New Salem,	1,517 46	
Orange,	500 00	
Rowe,	693 10	
Warwick,	50 00	
Wendell,	1,072 00	
Whately,	2,600 00	
		19,712 52
<i>Hampden County.</i>		
Brimfield,	\$2,865 68	
Chester,	832 58	
East Longmeadow,	880 05	
Granville,	1,829 37	
Hampden,	500 88	
Holland,	350 00	
Ludlow,	2,651 00	
Monson,	1,797 25	
Montgomery,	22 90	
Russell,	153 90	
Southwick,	884 96	
Springfield,	16 96	
Wilbraham,	1,408 75	
		14,194 28
<i>Hampshire County.</i>		
Chesterfield,	\$1,150 02	
Enfield,	2,000 00	
Greenwich,	1,045 00	
Hadley,	5,950 00	
Hatfield,	2,500 00	
Huntington,	769 84	
Middlefield,	595 82	
Pelham,	1,091 76	
Plainfield,	529 15	
Prescott,	1,380 00	
Southampton,	1,022 52	
Westhampton,	797 75	
Williamsburg,	1,186 52	
Worthington,	1,989 00	
		22,007 38
<i>Middlesex County.</i>		
Bedford,	\$2,939 65	
Boxborough,	600 00	
<i>Amounts carried forward,</i>	\$3,539 65	\$100,339 57

EXPENDITURES UNDER "SMALL TOWN" ACTS — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$3,539 65	\$100,339 57
Carlisle,	1,200 00	
Dracut,	4,981 76	
Dunstable,	775 00	
Hudson,	1,000 00	
North Reading,	2,000 00	
Reading,	100 00	
Stow,	1,000 00	
Townsend,	800 00	
Wilmington,	1,000 00	
		16,396 41
<i>Norfolk County.</i>		
Bellingham,	\$1,952 10	
Holbrook,	399 36	
Medway,	500 00	
Sharon,	4,247 90	
		7,099 36
<i>Plymouth County.</i>		
Carver,	\$2,800 00	
Halifax,	2,000 00	
Hanson,	1,970 39	
Norwell,	14 28	
Pembroke,	2,383 80	
Plympton,	1,489 62	
Wareham,	1,805 07	
		12,463 16
<i>Worcester County.</i>		
Berlin,	\$1,335 42	
Bolton,	3,250 00	
Boylston,	1,500 00	
Dana,	1,391 17	
Hardwick,	2,796 08	
Hubbardston,	1,500 00	
New Braintree,	2 50	
Oakham,	1,800 00	
Paxton,	1,899 16	
Petersham,	1,943 97	
Phillipston,	900 00	
Princeton,	643 42	
Royalston,	2,700 00	
Rutland,	579 43	
Shrewsbury,	2,000 00	
Sturbridge,	1,970 55	
Templeton,	2,000 00	
West Brookfield,	1,110 14	
Westborough,	4,000 00	
		33,321 84
		\$169,620 34

EXPENDITURES UNDER CHAPTER 221, ACTS OF 1915, FOR THE CONSTRUCTION OF ROADS IN WESTERN MASSACHUSETTS COUNTIES.

TOWN OR CITY.	Amount.	Totals.
<i>Route No. 1.</i>		
Sheffield,	\$1,749 32	
Great Barrington,	46 72	\$1,796 04
<i>Route No. 2.</i>		
Windsor,	\$167 54	
Goshen,	6,566 01	
Cummington,	4,369 97	
Hinsdale,	6 52	
Dalton,	1 46	11,111 50
<i>Route No. 3.</i>		
Otis,	\$12 11	
Sandisfield,	6 27	
Becket,	2 42	20 80
<i>Route No. 4.</i>		
Becket,	\$24,467 78	
Washington,	3,822 32	
Hinsdale,	9 73	28,299 83
<i>Route No. 5.</i>		
Worthington,	\$2,138 47	
Huntington,	7,471 72	
Cummington,	26 18	9,636 37
<i>Route No. 6.</i>		
Peru,	\$10,897 58	
Hinsdale,	3,622 39	
Worthington,	75	14,520 72
<i>Route No. 7.</i>		
Plainfield,	\$8 84	8 84
<i>Route No. 8.</i>		
Ware,	\$1,754 24	
Palmer,	6,129 55	
Belchertown,	1,429 48	
Enfield,	13 22	9,326 49
<i>Route No. 9.</i>		
Granville,	\$3 42	
Southwick,	1,988 11	
Agawam,	52 45	2,043 98
<i>Amount carried forward,</i>		\$76,764 57

EXPENDITURES UNDER CHAPTER 221, ACTS OF 1915, FOR THE CONSTRUCTION OF ROADS IN WESTERN MASSACHUSETTS COUNTIES —
Concluded.

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$76,764 57
<i>Route No. 10.</i>		
Goshen,	\$264 80	
Ashfield,	8,895 80	
Deerfield,	9,665 17	
Conway,	1,463 32	
		20,289 09
<i>Route No. 11.</i>		
Gill,	\$296 68	
Northfield,	6 44	
		303 12
<i>Route No. 12.</i>		
Barre,	\$4,481 23	
Petersham,	2,311 94	
Rutland,	19,563 69	
Oakham,	4,990 76	
		31,347 62
<i>Route No. 13.</i>		
Grafton,	\$899 72	
Upton,	759 91	
		1,659 63
<i>Route No. 14.</i>		
Warwick,	\$67 81	
Orange,	842 50	
		910 31
<i>Route No. 15.</i>		
Russell,	\$9,738 04	
		9,738 04
<i>Route No. 16.</i>		
Wales,	\$1 45	
		1 45
<i>Route No. 17.</i>		
Williamsburg,	\$8,065 16	
Chesterfield,	4,862 14	
Northampton,	185 66	
		13,112 96
		\$154,126 79

REPAIR AND MAINTENANCE EXPENDITURES.

[Chapter 183, Acts of 1915.]

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$1,615 02	
Bourne,	1,323 28	
Brewster,	911 08	
Chatham,	1,006 76	
Dennis,	1,718 95	
Eastham,	710 17	
Falmouth,	6,489 13	
Harwich,	1,250 94	
Mashpee,	195 67	
Orleans,	480 69	
Provincetown,	79 40	
Sandwich,	463 80	
Truro,	301 51	
Wellfleet,	1,377 30	
Yarmouth,	1,178 78	
		\$19,102 48
<i>Berkshire County.</i>		
Adams,	\$586 84	
Becket,	2,359 98	
Cheshire,	2,370 42	
Clarksburg,	490 97	
Dalton,	884 91	
Florida,	4,258 30	
Great Barrington,	343 23	
Hancock,	1,485 02	
Hinsdale,	192 84	
Lanesborough,	1,137 19	
Lee,	2,233 03	
Lenox,	2,663 68	
North Adams,	6,230 61	
Pittsfield,	2,968 69	
Richmond,	1,496 13	
Savoy,	1,904 90	
Sheffield,	1,230 05	
Stockbridge,	849 93	
Williamstown,	913 13	
Windsor,	197 59	
		34,797 44
<i>Bristol County.</i>		
Acushnet,	\$852 51	
Attleboro,	802 14	
Berkley,	263 37	
Dartmouth,	956 78	
<i>Amounts carried forward,</i>	\$2,874 80	\$53,899 92

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$2,874 80	\$53,899 92
Dighton,	653 78	
Easton,	111 32	
Fairhaven,	84 38	
Fall River,	6 00	
Freetown,	715 64	
Mansfield,	357 89	
North Attleborough,	796 28	
Norton,	1,021 60	
Raynham,	354 02	
Rehoboth,	504 61	
Seekonk,	367 33	
Somerset,	2,019 43	
Swansea,	2,163 86	
Taunton,	1,242 57	
Westport,	962 11	
		14,235 62
<i>Dukes County.</i>		
Chilmark,	\$1,944 69	
Edgartown,	997 60	
Gay Head,	148 66	
Oak Bluffs,	193 92	
Tisbury,	985 63	
West Tisbury,	725 48	
		4,995 98
<i>Essex County.</i>		
Amesbury,	\$807 36	
Andover,	1,161 27	
Beverly,	2,022 99	
Essex,	536 60	
Gloucester,	2,278 87	
Groveland,	701 67	
Hamilton,	1,038 64	
Haverhill,	2,212 80	
Ipswich,	2,097 96	
Lawrence,	287 22	
Lynn,	1,684 78	
Merrimac,	1,049 98	
Methuen,	1,813 34	
Middleton,	220 04	
Newbury,	1,391 35	
Newburyport,	912 28	
North Andover,	1,733 98	
Rockport,	944 43	
Rowley,	1,343 58	
<i>Amounts carried forward,</i>	\$24,239 14	\$73,131 52

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$24,239 14	\$73,131 52
Salem,	12,086 39	
Salisbury,	1,569 98	
Saugus,	1,573 18	
Swampscott,	10,968 79	
Wenham,	772 80	
West Newbury,	1,900 98	
		53,111 26
<i>Franklin County.</i>		
Ashfield,	\$373 27	
Bernardston,	853 93	
Buckland,	1,322 24	
Charlemont,	1,850 28	
Colrain,	275 60	
Deerfield,	1,348 90	
Erving,	1,306 69	
Gill,	23 50	
Greenfield,	1,126 83	
Montague,	906 46	
Northfield,	1,436 89	
Orange,	489 07	
Shelburne,	205 60	
Sunderland,	1,046 58	
Whately,	333 51	
		12,899 35
<i>Hampden County.</i>		
Agawam,	\$2,233 53	
Brimfield,	1,517 02	
Chester,	2,250 92	
Chicopee,	1,650 71	
East Longmeadow,	684 72	
Holyoke,	542 72	
Monson,	359 10	
Palmer,	3,009 69	
Russell,	2,713 92	
Wales,	100 04	
West Springfield,	459 31	
Westfield,	1,909 52	
Wilbraham,	2,627 37	
		20,058 57
<i>Hampshire County.</i>		
Amherst,	\$512 76	
Belchertown,	548 82	
Easthampton,	547 78	
<i>Amounts carried forward,</i>	\$1,609 36	\$159,200 70

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$1,609 36	\$159,200 70
Goshen,	43 98	
Granby,	1,659 70	
Hadley,	1,152 58	
Hatfield,	912 50	
Huntington,	786 06	
Northampton,	634 35	
South Hadley,	24,282 92	
Southampton,	86 45	
Ware,	921 62	
Williamsburg,	715 28	
		32,804 80
<i>Middlesex County.</i>		
Acton,	\$1,522 97	
Ashby,	664 40	
Ashland,	621 22	
Ayer,	576 81	
Bedford,	327 60	
Billerica,	201 67	
Boxborough,	751 87	
Burlington,	790 20	
Chelmsford,	1,887 80	
Concord,	1,488 00	
Dracut,	814 63	
Framingham,	881 17	
Groton,	504 28	
Holliston,	843 01	
Hudson,	352 01	
Lexington,	1,362 48	
Lincoln,	731 23	
Littleton,	641 56	
Lowell,	896 34	
Marlborough,	2,815 94	
Medford,	800 77	
Melrose,	328 38	
Natick,	1,640 33	
Newton,	187 28	
North Reading,	734 80	
Pepperell,	673 82	
Reading,	13,969 49	
Shirley,	492 95	
Somerville,	302 93	
Stoneham,	540 04	
Sudbury,	2,044 43	
Tewksbury,	1,704 48	
Townsend,	1,193 23	
<i>Amounts carried forward,</i>	\$43,288 12	\$192,005 50

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$43,288 12	\$192,005 50
Tyngsborough,	1,729 52	
Watertown,	463 23	
Wayland,	737 08	
Westford,	1,313 41	
Weston,	631 24	
Wilmington,	536 37	
Winchester,	797 46	
Woburn,	820 67	
		50,317 10
<i>Nantucket County.</i>		
Nantucket,	\$450 38	
		450 38
<i>Norfolk County.</i>		
Bellingham,	\$849 16	
Braintree,	194 41	
Canton,	4,032 26	
Cohasset,	618 66	
Dedham,	359 33	
Dover,	1,555 75	
Foxborough,	1,117 70	
Franklin,	1,081 57	
Holbrook,	555 46	
Milton,	553 54	
Needham,	991 11	
Norfolk,	1,215 36	
Norwood,	382 81	
Plainville,	429 00	
Quincy,	777 46	
Randolph,	176 33	
Sharon,	168 13	
Stoughton,	292 90	
Walpole,	2,353 35	
Wellesley,	273 06	
Westwood,	251 48	
Weymouth,	1,845 12	
Wrentham,	1,379 62	
		21,453 57
<i>Plymouth County.</i>		
Abington,	\$1,013 28	
Bridgewater,	748 66	
Brockton,	8,789 55	
Duxbury,	803 22	
Hanover,	505 44	
<i>Amounts carried forward,</i>	\$11,860 15	\$264,226 55

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$11,860 15	\$264,226 55
Hingham,	420 58	
Kingston,	278 63	
Lakeville,	784 88	
Marion,	861 44	
Marshfield,	1,805 87	
Mattapoisett,	300 69	
Middleborough,	1,778 43	
Pembroke,	148 83	
Plymouth,	1,083 95	
Rochester,	993 89	
Rockland,	231 49	
Scituate,	703 22	
Wareham,	4,210 74	
West Bridgewater,	228 12	
Whitman,	191 97	
		25,882 88
<i>Suffolk County.</i>		
Boston,	\$2,228 65	
Chelsea,	825 23	
Revere,	1,666 41	
		4,720 29
<i>Worcester County.</i>		
Ashburnham,	\$1,662 35	
Athol,	210 88	
Auburn,	1,374 30	
Barre,	803 38	
Blackstone,	1,386 58	
Brookfield,	1,982 97	
Charlton,	2,463 09	
Douglas,	749 14	
Dudley,	892 18	
Fitchburg,	901 01	
Gardner,	347 46	
Grafton,	1,750 03	
Hardwick,	178 57	
Harvard,	445 78	
Holden,	1,874 91	
Lancaster,	386 26	
Leicester,	2,125 82	
Leominster,	1,088 39	
Lunenburg,	1,127 81	
Milford,	473 91	
Millbury,	1,521 50	
New Braintree,	33 42	
North Brookfield,	677 38	
<i>Amounts carried forward,</i>	\$24,457 12	\$294,829 72

REPAIR AND MAINTENANCE EXPENDITURES — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$24,457 12	\$294,829 72
Northborough,	1,347 25	
Northbridge,	117 76	
Oxford,	901 11	
Paxton,	1,234 30	
Phillipston,	296 81	
Princeton,	204 27	
Rutland,	260 62	
Shrewsbury,	21,173 69	
Southborough,	764 65	
Southbridge,	68 55	
Spencer,	1,509 74	
Sterling,	1,118 38	
Sturbridge,	205 07	
Sutton,	723 81	
Templeton,	651 74	
Uxbridge,	992 27	
Warren,	1,400 35	
Webster,	940 83	
West Boylston,	944 22	
West Brookfield,	1,180 36	
Westborough,	1,007 78	
Westminster,	1,070 65	
Winchendon,	203 45	
Worcester,	1,696 28	
	64,471 06	
		\$359,300 78

EXPENDITURES FROM MOTOR VEHICLE FEES FUND.

[Chapter 534, Acts of 1909.]

REPAIR AND MAINTENANCE OF TOWN AND COUNTY WAYS (CHAPTER 525, ACTS OF 1910).

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Falmouth,	\$13 24	
Harwich,	500 00	\$513 24
<i>Berkshire County.</i>		
Becket,	\$1,409 53	
Cheshire,	1,744 76	
Clarksburg,	4,184 00	
Lanesborough,	1,312 97	
Mount Washington,	1,100 00	
New Ashford,	3,792 89	
New Marlborough,	133 72	
Peru,	1,950 00	
Savoy,	5,825 87	
Sheffield,	980 60	
Williamstown,	7,297 44	
Windsor,	143 68	
		29,875 46
<i>Bristol County.</i>		
Dighton,	\$19 18	
Freetown,	4,576 08	
Somerset,	59 23	
		4,654 49
<i>Dukes County.</i>		
Edgartown,	\$8 99	
Oak Bluffs,	9 01	
		18 00
<i>Essex County.</i>		
Andover,	\$2,000 00	
Danvers,	1,016 99	
Essex,	1,656 28	
Georgetown,	2,252 94	
Groveland,	383 11	
Ipswich,	1,121 37	
Lynnfield,	682 82	
Middleton,	1,483 53	
Newbury,	2,067 88	
Peabody,	3,216 74	
Rowley,	3,326 67	
Salisbury,	1,464 41	
Saugus,	1,969 95	
Topsfield,	1,894 79	
Wenham,	500 00	
		25,037 48
<i>Amount carried forward,</i>		\$60,098 67

REPAIR AND MAINTENANCE, ETC. — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>	.	\$60,098 67
<i>Franklin County.</i>		
Buckland,	\$697 12	
Charlemont,	58 01	
Erving,	379 00	
Shelburne,	726 36	
Whately,	63 96	
		1,924 45
<i>Hampden County.</i>		
Blandford,	\$2,448 30	
East Longmeadow,	2,493 75	
Longmeadow,	6,050 41	
Southwick,	70 80	
		11,063 26
<i>Hampshire County.</i>		
Chesterfield,	\$202 19	
Cummington,	2,775 35	
Easthampton,	3,403 77	
Goshen,	3,965 32	
Granby,	1,964 62	
South Hadley,	315 53	
Williamsburg,	286 23	
		12,913 01
<i>Middlesex County.</i>		
Acton,	\$221 67	
Ashby,	1,000 00	
Bedford,	5,000 00	
Billerica,	244 50	
Burlington,	605 85	
Dunstable,	288 58	
Holliston,	1,500 00	
Hopkinton,	1,467 53	
Littleton,	94 99	
Natick,	1,169 18	
Pepperell,	1,000 00	
Reading,	2,816 67	
Sherborn,	900 00	
Stoneham,	2,500 00	
Stow,	344 25	
Sudbury,	657 81	
Tyngsborough,	500 00	
Wakefield,	2,000 00	
Wayland,	1,674 37	
Westford,	573 88	
Wilmington,	2,000 00	
		26,559 28
<i>Amount carried forward,</i>	.	\$112,558 67

REPAIR AND MAINTENANCE, ETC. — Concluded.

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i> . . . . .	. . . . .	\$112,558 67
<i>Norfolk County.</i>		
Medfield,	\$834 82	
Medway,	1,000 00	
Millis,	900 00	
Needham,	522 15	
		3,256 97
<i>Plymouth County.</i>		
Bridgewater,	\$25 00	
Kingston,	308 00	
Lakeville,	2,000 00	
Marshfield,	2,971 10	
Norwell,	248 91	
Pembroke,	600 40	
Rochester,	863 46	
Rockland,	2,000 00	
Wareham,	124 93	
		9,141 80
<i>Worcester County.</i>		
Athol,	\$1,124 04	
Barre,	2,525 00	
Berlin,	420 00	
Bolton,	335 48	
Brookfield,	746 92	
Dudley,	3,852 59	
Harvard,	2,250 00	
Leicester,	55 36	
Mendon,	2,093 66	
Milford,	2,443 05	
Millbury,	2,895 40	
Northborough,	2,000 00	
Oakham,	204 10	
Oxford,	1,433 44	
Princeton,	2,000 00	
Rutland,	2,633 23	
Southbridge,	2,003 00	
Spencer,	19 50	
Sturbridge,	2,089 68	
Sutton,	304 82	
Templeton,	769 30	
Uxbridge,	164 87	
Warren,	231 43	
West Boylston,	94	
Westminster,	255 71	
Winchendon,	1,094 84	
		33,946 36
		\$158,903 80

REPAIRS OF STATE HIGHWAYS.

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$2,581 07	
Bourne,	2,267 32	
Brewster,	1,351 75	
Chatham,	4,833 05	
Dennis,	1,032 64	
Eastham,	2,271 12	
Falmouth,	9,580 62	
Harwich,	800 97	
Mashpee,	249 88	
Orleans,	3,508 37	
Provincetown,	793 42	
Sandwich,	141 75	
Truro,	609 84	
Wellfleet,	550 70	
Yarmouth,	1,071 60	
		\$31,644 10
<i>Berkshire County.</i>		
Adams,	\$459 65	
Becket,	4,443 61	
Cheshire,	784 71	
Clarksburg,	222 91	
Dalton,	215 27	
Egremont,	677 11	
Florida,	2,683 87	
Great Barrington,	2,433 83	
Hancock,	195 85	
Hinsdale,	252 23	
Lanesborough,	169 75	
Lee,	718 61	
Lenox,	1,305 66	
North Adams,	2,280 91	
Pittsfield,	7,348 38	
Richmond,	524 80	
Savoy,	1,224 79	
Sheffield,	454 39	
Stockbridge,	533 98	
Williamstown,	3,672 05	
Windsor,	799 49	
		31,401 85
<i>Bristol County.</i>		
Acushnet,	\$1,053 70	
Attleboro,	906 20	
Berkley,	48 50	
Dartmouth,	7,647 03	
<i>Amounts carried forward,</i>	\$9,655 43	\$63,045 95

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$9,655 43	\$63,045 95
Dighton,	8,553 87	
Easton,	133 35	
Fairhaven,	2,271 28	
Freetown,	439 41	
Mansfield,	74 72	
North Attleborough,	1,113 61	
Norton,	714 84	
Raynham,	449 83	
Rehoboth,	10,118 25	
Seekonk,	918 04	
Somerset,	26,267 39	
Swansea,	2,272 58	
Taunton,	7,742 38	
Westport,	632 68	
		71,357 66
<i>Dukes County.</i>		
Chilmark,	\$421 23	
Edgartown,	118 00	
Gay Head,	29 75	
Oak Bluffs,	184 31	
Tisbury,	232 56	
West Tisbury,	490 17	
		1,476 02
<i>Essex County.</i>		
Amesbury,	\$383 48	
Andover,	9,160 80	
Beverly,	13,116 26	
Essex,	197 86	
Gloucester,	549 13	
Groveland,	135 51	
Hamilton,	403 22	
Haverhill,	436 03	
Ipswich,	1,445 50	
Lawrence,	141 64	
Lynn,	132 31	
Merrimac,	197 07	
Methuen,	436 85	
Middleton,	106 05	
Newbury,	854 20	
Newburyport,	326 36	
North Andover,	816 20	
Rockport,	73 19	
Rowley,	484 83	
Salem,	395 29	
<i>Amounts carried forward,</i>	\$29,791 78	\$135,879 63

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$29,791 78	\$135,879 63
Salisbury,	658 36	
Saugus,	1,132 50	
Swampscott,	8,553 92	
Wenham,	456 21	
West Newbury,	286 39	
		40,879 16
<i>Franklin County.</i>		
Ashfield,	\$311 86	
Bernardston,	686 64	
Buckland,	1,326 54	
Charlemont,	1,072 78	
Colrain,	723 43	
Deerfield,	9,136 44	
Erving,	950 05	
Greenfield,	14,037 00	
Montague,	6,549 20	
Northfield,	540 48	
Orange,	617 07	
Shelburne,	1,915 95	
Sunderland,	301 60	
Whately,	174 34	
		38,343 38
<i>Hampden County.</i>		
Agawam,	\$401 48	
Brimfield,	2,502 22	
Chester,	6,580 36	
Chicopee,	122 01	
East Longmeadow,	179 13	
Holyoke,	668 10	
Monson,	198 90	
Palmer,	6,637 51	
Russell,	453 87	
Wales,	104 91	
West Springfield,	30,263 86	
Westfield,	3,858 45	
Wilbraham,	774 30	
		52,745 10
<i>Hampshire County.</i>		
Amherst,	\$1,123 65	
Belchertown,	520 88	
Easthampton,	128 88	
Goshen,	852 30	
Granby,	1,033 78	
<i>Amounts carried forward,</i> . . .	\$3,659 49	\$267,847 27

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$3,659 49	\$267,847 27
Hadley,	15,697 87	
Hatfield,	174 34	
Huntington,	474 99	
Northampton,	618 91	
South Hadley,	17,490 77	
Southampton,	43 00	
Ware,	666 01	
Williamsburg,	15,004 16	
		53,829 54
<i>Middlesex County.</i>		
Acton,	\$563 60	
Ashby,	15,748 17	
Ashland,	221 80	
Ayer,	125 10	
Bedford,	258 27	
Billerica,	114 56	
Boxborough,	404 85	
Burlington,	647 92	
Chelmsford,	1,088 72	
Concord,	486 47	
Dracut,	717 75	
Framingham,	245 04	
Groton,	972 66	
Holliston,	374 46	
Hudson,	24 46	
Lexington,	763 29	
Lincoln,	10,928 65	
Littleton,	1,473 72	
Lowell,	625 50	
Marlborough,	5,941 19	
Medford,	66 25	
Melrose,	65 20	
Natick,	350 56	
Newton,	6,908 09	
North Reading,	265 58	
Pepperell,	539 52	
Reading,	8,737 61	
Shirley,	143 26	
Somerville,	29,298 57	
Stoneham,	4,129 32	
Sudbury,	1,018 79	
Tewksbury,	1,004 25	
Townsend,	2,643 45	
Tyngsborough,	718 21	
Watertown,	89 57	
<i>Amounts carried forward,</i>	\$97,704 41	\$321,676 81

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$97,704 41	\$321,676 81
Wayland,	340 63	
Westford,	1,005 22	
Weston,	464 27	
Wilmington,	251 29	
Winchester,	617 98	
Woburn,	426 38	
		100,810 18
<i>Nantucket County.</i>		
Nantucket,	\$287 98	
		287 98
<i>Norfolk County.</i>		
Bellingham,	\$327 96	
Braintree,	136 27	
Canton,	4,057 95	
Cohasset,	3,642 15	
Dedham,	261 00	
Dover,	44 10	
Foxborough,	244 64	
Franklin,	255 65	
Holbrook,	234 37	
Milton,	251 45	
Needham,	130 37	
Norfolk,	5,813 48	
Norwood,	2,120 31	
Plainville,	1,136 94	
Quiney,	869 18	
Randolph,	182 80	
Sharon,	40 37	
Stoughton,	246 01	
Walpole,	12,973 66	
Wellesley,	128 22	
Westwood,	432 03	
Weymouth,	2,012 91	
Wrentham,	7,059 28	
		42,601 10
<i>Plymouth County.</i>		
Abington,	\$7,911 88	
Bridgewater,	6,034 54	
Brockton,	9,392 11	
Duxbury,	1,840 77	
Hanover,	226 17	
Hingham,	3,506 18	
Kingston,	172 57	
<i>Amounts carried forward,</i>	\$29,084 22	\$465,376 07

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$29,084 22	\$465,376 07
Lakeville,	1,270 34	
Marion,	14,273 38	
Marshfield,	9,690 99	
Mattapoisett,	8,493 22	
Middleborough,	21,715 26	
Pembroke,	131 50	
Plymouth,	7,278 21	
Rochester,	293 96	
Rockland,	434 33	
Scituate,	11,351 98	
Wareham,	5,428 55	
West Bridgewater,	247 07	
Whitman,	6,249 45	
		115,942 46
<i>Suffolk County.</i>		
Boston,	\$1,672 44	
Chelsea,	2,486 85	
Revere,	17,600 80	
		21,760 09
<i>Worcester County.</i>		
Ashburnham,	\$193 91	
Athol,	141 86	
Auburn,	1,133 77	
Barre,	729 07	
Blackstone,	764 34	
Brookfield,	394 13	
Charlton,	1,268 03	
Douglas,	360 49	
Dudley,	183 24	
Fitchburg,	1,069 15	
Gardner,	7,866 21	
Grafton,	698 58	
Hardwick,	91 03	
Harvard,	252 73	
Holden,	392 08	
Lancaster,	260 43	
Leicester,	1,459 53	
Leominster,	375 68	
Lunenburg,	618 06	
Milford,	276 83	
Millbury,	861 54	
New Braintree,	30 52	
North Brookfield,	33 06	
Northborough,	9,061 65	
<i>Amounts carried forward,</i>	\$28,515 92	\$603,078 62

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$28,515 92	\$603,078 62
Northbridge,	41 16	
Oxford,	1,181 17	
Paxton,	343 70	
Phillipston,	767 12	
Princeton,	249 97	
Rutland,	216 66	
Shrewsbury,	8,367 15	
Southborough,	221 79	
Southbridge,	3,234 72	
Spencer,	143 05	
Sterling,	629 23	
Sturbridge,	467 20	
Sutton,	364 44	
Templeton,	1,239 72	
Uxbridge,	119 70	
Warren,	289 85	
Webster,	110 80	
West Boylston,	453 65	
West Brookfield,	477 48	
Westborough,	148 09	
Westminster,	931 57	
Winchendon,	1,855 71	
Worcester,	557 46	
	50,927 31	
		\$654,005 93

REPAIRS OF STATE HIGHWAYS — *Concluded.*

Expenditures under chapter 525, Acts of 1910,	. . . . .	\$158,903 80
Repairs of State highways,	. . . . .	654,005 93
Cost of engineering,	. . . . .	69,745 52
Traffic census,	. . . . .	4,660 87
Analysis of tar and oil,	. . . . .	1,815 15
Marking through routes,	. . . . .	576 14
Machinery account: —		
3 steam rollers,	. . . . .	\$4,000 00
16 automobiles,	. . . . .	3,587 40
2 hot oil mixers,	. . . . .	1,500 00
1 rack drill,	. . . . .	1,100 00
1 compressor, complete,	. . . . .	133 50
20 heating kettles,	. . . . .	1,694 68
2 tank wagons with steam coils,	. . . . .	585 00
2 2-horse street sweepers, with extra broom,	. . . . .	500 00
1 Monarch distributor, complete, with attachment,	. . . . .	659 56
1 600-gallon automatic pressure distributor,	. . . . .	625 00
1 20-horse power upright tubular boiler mounted on wheels, complete,	. . . . .	355 00
7 "Clafin" patent boiler tube soot blowers,	. . . . .	144 00
1 No. 1 Glide road machine,	. . . . .	110 00
5 drags,	. . . . .	84 50
2 construction plows,	. . . . .	39 00
1 hand roller,	. . . . .	8 00
1 stove,	. . . . .	8 00
1 No. 4 Gould rotary pump,	. . . . .	93 39
1 No. 2 spray bar with No. 40 nozzles,	. . . . .	15 00
13 tents with poles and flies,	. . . . .	249 29
Rent, light, heat and fuel,	. . . . .	441 61
Salaries and labor,	. . . . .	2,687 95
Freight and express,	. . . . .	466 47
Tools and apparatus,	. . . . .	2,958 81
Materials and repairs,	. . . . .	1,109 87
Supplies, parts and fittings,	. . . . .	1,909 93
Auto expense (supplies, repairs and storage),	. . . . .	7,951 20
Motor cycles (expense, supplies and repairs),	. . . . .	374 86
Miscellaneous items,	. . . . .	454 75
	33,846 77	
Amount carried forward,	\$923,554 18

<i>Amount brought forward,</i>	\$923,554 18
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AUTOMOBILE DEPARTMENT EXPENSE.

Salaries of clerks and clerical assistants,	\$56,421 27
Rent of offices,	4,163 98
Number plates, motor cycle seals and speed signs,	15,655 00
Printing,	9,438 51
Postage,	10,596 34
Typewriters purchased and rented,	371 31
Office supplies,	1,739 17
Cartage and storage,	1,289 24
Miscellaneous items, including express charges, car fares, telegrams and other minor office expenses,	330 78
Total, automobile department,	100,005 60

EXAMINER'S DEPARTMENT EXPENSE.

Salaries of inspectors and examiners,	\$17,966 64
Salaries of clerks and stenographers,	3,664 41
Rent,	777 00
Mileage books,	2,362 50
Traveling expenses,	4,659 74
Printing,	533 25
Postage, including stamped envelopes,	457 36
Office supplies,	92 59
Newspaper clippings,	120 00
Miscellaneous items,	18 73
Total, examiner's department,	30,652 22
Rebates of automobile fees,	13,120 50
Total, motor vehicle fees fund,	\$1,067,332 50

GENERAL EXPENSES, DEC. 1, 1914, TO NOV. 30, 1915.

[Under Chapter 183, Acts of 1915.]

Salaries of commissioners,	\$13,000 00
Travel of commissioners,	3,024 46
Travel and expense of chief engineer,	512 61
Salaries of clerical assistants and principal assistant engineers,	29,018 98
Rent of offices,	6,932 53
<i>Amount carried forward,</i>	<i>\$52,488 58</i>

<i>Amount brought forward,</i>	. . . . .	\$52,488 58
Printing and binding annual report,	. . . . .	1,335 33
Printing,	. . . . .	2,743 76
Postage, including postal cards and envelopes,	. . . . .	2,309 09
Office and typewriter supplies,	. . . . .	829 99
Telephone, including tolls,	. . . . .	853 83
Recording land takings and easements,	. . . . .	218 24
Advertising hearings,	. . . . .	59 34
Rental and repair of typewriters,	. . . . .	5 25
Repairs to steam road rollers and other road machinery,	. . . . .	14,996 89
Miscellaneous items, including express charges, car fares, telegrams and other minor office expenses,	. . . . .	459 17
		<hr/>
		\$76,299 47

Brightman Street bridge at Fall River:—

Pay rolls,	. . . . .	\$174 31
Salaries,	. . . . .	6,860 85
Electric service and lighting,	. . . . .	1,027 10
Telephone service,	. . . . .	45 94
Tools and supplies,	. . . . .	329 29
		<hr/>
		\$8,437 49

Merrimac River bridge at Newburyport:—

Pay rolls,	. . . . .	\$128 57
Salaries,	. . . . .	2,858 79
Telephone,	. . . . .	36 37
Repairs,	. . . . .	286 03
Tools and supplies,	. . . . .	35 13
Electric service and lighting,	. . . . .	605 98
		<hr/>
		\$3,950 87

MISCELLANEOUS EXPENDITURES.

[Under Chapters 416 and 744, Acts of 1911, and Chapter 236, Acts of 1914.]

Expenditures for the repair of a certain highway in the town of Truro,	\$479 97
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[Under Chapter 703, Acts of 1912.]

Expenditures for the construction or improvement of a high- way between the towns of Ware and West Brookfield,	\$402 91
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[Under Chapter 639, Acts of 1913.]

Expenditures for the laying out and construction of a so- called traffic road in the town of Revere, extending south- erly from the Point of Pines,	\$64,962 87
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[Under Chapter 778, Acts of 1913.]

Expenditures for the laying out and construction of Humphrey Street in the town of Swampscott, \$25,160 41

[Under Chapter 128, Resolves of 1913.]

Expenditures for the construction of the River Road so-called, between the town of Williamstown and the city of Pittsfield, \$368 57

[Under Chapter 502, Acts of 1914.]

Expenditures for the improvement of a highway between the towns of Dalton and Goshen in the counties of Berkshire and Hampshire, \$15 35

[Under Chapter 503, Acts of 1914.]

Expenditures for the improvement of the highway leading from the town of Hinsdale to the town of Chester through the town of Middlefield, \$575 81

[Under Chapter 668, Acts of 1914.]

Expenditures for the improvement of the highway leading from the town of Holden to the town of Rutland, \$8,604 44

[Under Chapter 754, Acts of 1914.]

Expenditures for the construction of a State highway in the town of New Marlborough, \$9,597 11

[Under Chapter 711, Acts of 1914, and Chapter 232, Acts of 1915.]

Expenditures for the highway leading from the town of Milford to the town of Southborough through the town of Hopkinton, \$13,292 17

[Under Chapter 733, Acts of 1914.]

Expenditures for the construction and maintenance of a State highway in the town of Egremont, \$14,732 09

[Under Chapter 756, Acts of 1914.]

Expenditures for the improvement of a highway in the towns of Becket, Washington and Hinsdale, \$7,843 33

[Under Chapter 779, Acts of 1914.]

Expenditures for the improvement of a highway in the towns of Southbridge, Dudley and Webster, \$9,712 81

[Under Chapter 78, Resolves of 1914.]

Expenditures for the further construction of the River Road, so-called, from the town of Williamstown to the city of Pittsfield (Lanesborough), \$7,528 02

[Under Chapter 196, Acts of 1915.]

Expenditures for the improvement and construction of Concord Avenue in the city of Cambridge,	\$14,020 19
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[Under Chapter 229, Acts of 1915.]

Expenditures for the improvement of a highway in the town of Ashburnham,	\$6,112 14
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[Under Chapter 230, Acts of 1915.]

Expenditures for the construction of a State highway from the town of Norton to the city of Taunton,	\$191 04
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[Under Chapter 242, Acts of 1915.]

Expenditures for the improvement of a highway in the towns of Mashpee and Barnstable,	\$733 70
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[Under Chapter 257, Acts of 1915.]

Expenditures for the improvement of the highway between North Brookfield and Barre Plains,	\$254 47
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[Under Chapter 72, Resolves of 1915.]

Expenditure under resolve in favor of Edward B. Atwood for injuries to property on State highway,	\$98 50
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[Under Chapter 72, Resolves of 1915.]

Expenditures under resolve in favor of Asa F. Streeter, as authorized by Executive Council,	\$100 00
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SUMMARY OF EXPENDITURES.

For construction,	\$759,022 93
For construction under "small town" acts,	169,620 34
For western Massachusetts roadways, under chapter 221, Acts of 1915,	154,126 79
For road repair and maintenance, from revenue,	359,300 78
For road construction under chapter 525, Acts of 1910,	158,903 80
For road repair and maintenance (motor vehicle fees fund),	764,650 38
For expenditures connected with automobile registration,	100,005 60
For expense of examiners and investigators,	30,652 22
For rebates of automobile fees, under chapter 534, Acts of 1909,	13,120 50
For general expense under chapter 186, Acts of 1915,	76,299 47
For expenditures under chapter 186, Acts of 1915 (bridges),	12,388 36
For expenditures under chapter 186, Acts of 1915 (Truro),	479 97
For expenditures under chapter 703, Acts of 1912,	402 91
For expenditures under chapter 639, Acts of 1913,	64,962 87

Amount carried forward, \$2,663,936 92

<i>Amount brought forward,</i>	. . . . .	\$2,663,936 92
For expenditures under chapter 778, Acts of 1913,	. . . . .	25,160 41
For expenditures under chapter 128, Resolves of 1913,	. . . . .	368 57
For expenditures under chapter 502, Acts of 1914,	. . . . .	15 35
For expenditures under chapter 503, Acts of 1914,	. . . . .	575 81
For expenditures under chapter 668, Acts of 1914,	. . . . .	8,604 44
For expenditures under chapter 754, Acts of 1914,	. . . . .	9,597 11
For expenditures under chapter 711, Acts of 1914, and chapter 232, Acts of 1915,	. . . . .	13,292 17
For expenditures under chapter 733, Acts of 1914,	. . . . .	14,732 09
For expenditures under chapter 756, Acts of 1914,	. . . . .	7,843 33
For expenditures under chapter 779, Acts of 1914,	. . . . .	9,712 81
For expenditures under chapter 78, Resolves of 1914,	. . . . .	7,528 02
For expenditures under chapter 196, Acts of 1915,	. . . . .	14,020 19
For expenditures under chapter 229, Acts of 1915,	. . . . .	6,112 14
For expenditures under chapter 230, Acts of 1915,	. . . . .	191 04
For expenditures under chapter 242, Acts of 1915,	. . . . .	733 70
For expenditures under chapter 257, Acts of 1915,	. . . . .	254 47
For expenditures under chapter 72, Resolves of 1915, in favor of Edward B. Atwood,	. . . . .	98 50
For expenditures under chapter 72, Resolves of 1915, in favor of Asa F. Streeter,	. . . . .	100 00
		<hr/>
		\$2,782,877 07

WM. D. SOHIER,

F. D. KEMP,

JAMES W. SYNAN,

Massachusetts Highway Commission.

APPENDIX A.

RELATING TO THE WORK OF THE AUTOMOBILE DEPARTMENT.

Statement showing the Number of Registration Certificates and Licenses to operate issued during the Fiscal Year 1915, also the Fees received for the Same, together with the Fees for Examinations, for Copies of Certificates of Registration and Licenses, etc., and Fines for Violation of the Automobile Law.

Certificates of registration:—

Automobiles,	. . . . .	102,633	\$973,100 50
Motor cycles,	. . . . .	9,520	18,258 00
Manufacturers and dealers,	. . . . .	1,742	50,686 50

Licenses to operate:—

Operators,	. . . . .	35,623 at \$2 00	71,246 00
Chauffeurs,	. . . . .	9,033 at 2 00	18,066 00
Operators' renewals,	. . . . .	63,576 at 50	31,788 00
Chauffeurs' renewals,	. . . . .	25,703 at 50	12,851 50
Examinations,	. . . . .	10,523 at 2 00	21,046 00
Copies of certificates and licenses furnished,	. . . . .	4,093 at 50	2,046 50
Number plates and seals,	. . . . .		1,307 50

Gross receipts,	. . . . .	\$1,200,396 50
Court fines received by the Treasurer and Receiver-General,		43,424 30

Deduct rebates on registration fees,	. . . . .	\$1,243,820 80
		13,158 00
Miscellaneous receipts, including interest on deposits,	. . . . .	\$1,230,662 80
Total receipts for the year,	. . . . .	5,061 19

REPORT OF THE EXAMINING AND INVESTIGATING DEPARTMENT.

F. I. BIELER, *Secretary, Massachusetts Highway Commission.*

DEAR SIR: — I respectfully submit the following as the ninth annual report of the examining and investigating department, for the period from Dec. 1, 1914, to Dec. 1, 1915.

EXAMINATIONS.

During the year, examinations have been held daily in Boston, and either once a week or every other week in Pittsfield, Springfield, Worcester, Fitchburg, Brockton, New Bedford, Fall River, Lowell and Salem. By request, a few examinations have been conducted in other cities, these examinations being given, in most cases, to members of the fire and police departments and other municipal employees.

The following table gives a comparison of the examinations conducted this year with those of 1914: —

	1914.	1915.
Total number of examinations (chauffeurs),	7,504	10,418
Total number of examinations (operators),	55	78
Total number of examinations (chauffeurs reported unfit),	2,604	3,724
Total number of examinations (operators reported unfit),	20	39
Total number of chauffeurs examined,	5,610	7,305
Total number of chauffeurs passed,	4,900	6,694
Total number of chauffeurs failed to receive licenses,	710	611
Total number of operators examined,	49	61
Total number of operators passed,	35	39
Total number of operators failed to receive licenses,	14	22

It will be seen from the above table that there has been an increase of 1,707 in the number of persons examined, and an increase of 2,937 in the number of examinations conducted; 1,139 more persons were reported unfit. The number of persons who finally passed the examination increased 1,798. On the basis of percentage, 8.59 per cent. finally failed, as against 12.79 per cent. for 1914, indicating that applicants have been better prepared. Of the total number of persons examined, 61 were applicants for operators' licenses and were given 78 examinations; 39 finally passed and 22 failed. Of the total number of examinations, 4,734 were conducted in Boston, the balance (5,762) in other cities. Seven thousand three hundred and fifty-five of these examinations have been conducted by the two examiners; the balance (3,141) by the inspectors. This increase in the number of examinations has necessitated the using of our inspectors to a large extent in the work of examining. Many days we have been compelled to use five or six men in this work.

INVESTIGATIONS AND PROSECUTIONS.

A comparison of the number of cases investigated in 1914 and 1915 is given below: —

	1914.	1915.
Accidents (nonfatal),	263	231
Accidents (fatal),	235	297
Accidents (brief reports),	325	385
General reputation,	69	55
Miscellaneous,	145	194
Garages, dealers,	189 ¹	117
Total number of reports received from investigators, . . .	1,226	1,279
Garages inspected,	440	304
Prosecutions,	77	74
Total amount of fines,	\$2,435	\$2,760

¹ To September only.

There were 299 fatal accidents, resulting in 309 deaths. Two hundred and eighty-four of these accidents occurred in Massachusetts, and resulted in 294 deaths. Two deaths occurred in Vermont, 4 in New Hampshire, 2 in Connecticut, 6 in Rhode Island, and 1 in New York. The fatal accidents which occurred in other States were investigated for the reason that the operators were residents of Massachusetts. Of the 294 deaths which occurred in Massachusetts, 2 were the result of asphyxiation by gas fumes, and may be regarded as having been only indirectly connected with the operation of automobiles. Of the 297 reports received from investigators concerning fatal accidents, 4 occurred during the fiscal year 1914.

Owing to illness, Inspector Paul H. Weinert was granted a leave of absence from July 1, 1915, to Nov. 1, 1915.

On Dec. 1, 1914, the number of districts in the State was increased from seven to eight and an inspector assigned to each district. This dividing of the State has continued to be a success. One inspector has been unassigned to any particular section of the State, his work largely consisting of cases referred to him from the office.

During the year we have inspected 304 garages and dealers. Many to whom dealers' registration numbers had been issued were found not legally entitled to them. These cases were reported to the Board. If we found that a garage was not keeping a proper record of motor vehicles which entered and left their place of business, the department has sent a letter, calling their attention to the matter and cautioning them to comply strictly with the letter and spirit of the law.

The department has investigated 385 accidents concerning which brief reports have been filed, they not being considered serious enough to call to the attention of the Board.

In addition to investigating accidents, the investigators have

devoted much time to the serving of suspension and revocation notices, the securing of licenses that have been suspended or revoked, the investigating of complaints made to the Commission, the habits and general reputation of operators, and work of a more or less miscellaneous nature that has been assigned them from time to time.

We have received over 14,000 newspaper clippings referring to accidents and prosecutions in which motor vehicles were involved. Many of these clippings were duplicates.

In compliance with chapter 530 of the Acts of 1913, the department received approximately 11,000 letters from operators who have been involved in accidents. These letters are filed under the name of the operator, and in addition cards have been written showing the location of each accident. From these letters and newspaper clippings, a carefully analyzed tabulation has been kept, showing all accidents in which motor vehicles were involved.

DEATHS, INJURIES, ACCIDENTS.

A comparison of the figures for the year 1915 with those of 1914 is given below:—

	KILLED.		INJURED.	
	1914.	1915.	1914.	1915.
Pedestrians,	150	155	2,303	3,118
Occupants of automobiles,	56	84	579	1,321
Motor cycle riders,	15	15	337	636
Bicycle riders,	3	3	256	497
Occupants of carriages,	2	4	217	421
Street car passengers,	—	—	15	12
Totals,	229	294	4,010	6,197

Accidents.

	1914.	1915.
Motor vehicles v. pedestrians,	2,393	3,292
Motor vehicles v. motor vehicles,	2,521	3,843
Motor vehicles v. carriages, etc.,	1,092	1,174
Motor vehicles v. bicycles,	345	532
Motor vehicles v. trolley cars,	495	694
Motor vehicles v. pole, curb, etc.,	77	1,056
Motor vehicles v. trains,	22	30
Motor vehicles v. horse, dog, etc.,	310	369
Motor vehicles v. miscellaneous,	—	16
Totals,	7,961	10,996
Accidents in daytime,	6,009	8,139
Accidents after dark,	1,952	2,717
Accidents on country roads,	1,042	1,773
Accidents on city or town streets,	6,019	9,133

The above statistics show a summary of the deaths, injuries and accidents in which all types of motor vehicles have been involved. On a basis of percentage, there has been an increase of 28 per cent. in the number of persons killed, 54.5 per cent. in the number injured, and 37 per cent. in the number of accidents. Seventy-five per cent. of these accidents occurred in the daytime, and 25 per cent. after dark.

The following schedules show where the automobile and motor cycle accidents have been apportioned under separate headings.

Schedule of Automobile Accidents, 1915.

	Killed.	Injured.
Pedestrians,	181	3,038
Occupants of automobiles,	83	1,515
Occupants of carriages,	4	419
Bicycle riders,	3	490
Street car passengers,	-	12
Totals,	271	5,474

Accidents.

Automobiles <i>v.</i> pedestrians,	. . . . .	3,201
Automobiles <i>v.</i> automobiles,	. . . . .	3,308
Automobiles <i>v.</i> carriages, etc.,	. . . . .	1,149
Automobiles <i>v.</i> bicycles,	. . . . .	521
Automobiles <i>v.</i> trolley cars,	. . . . .	594
Automobiles <i>v.</i> pole, curb, etc.,	. . . . .	998
Automobiles <i>v.</i> trains,	. . . . .	24
Automobiles <i>v.</i> horse, dog, etc.,	. . . . .	364
Automobiles <i>v.</i> miscellaneous,	. . . . .	16
Total,	. . . . .	10,175
Accidents in daytime,	. . . . .	7,575
Accidents after dark,	. . . . .	2,600
Accidents on country roads,	. . . . .	1,097
Accidents on city or town streets,	. . . . .	9,078

Schedule of Motor Cycle Accidents, 1915.

	Killed.	Injured.
Pedestrians,	7	72
Motor cycle riders,	15	636
Occupants of automobiles,	1	6
Occupants of carriages,	-	2
Bicycle riders,	-	7
Totals,	23	723

Accidents.

Motor cycles <i>v.</i> pedestrians,	81
Motor cycles <i>v.</i> motor cycles,	7
Motor cycles <i>v.</i> automobiles,	528
Motor cycles <i>v.</i> carriages, etc.,	25
Motor cycles <i>v.</i> bicycles,	11
Motor cycles <i>v.</i> trolley cars,	10
Motor cycles <i>v.</i> pole, curb, etc.,	58
Motor cycles <i>v.</i> trains,	6
Motor cycles <i>v.</i> horse, dog, etc.,	5
Total,	731

Accidents in daytime,	614
Accidents after dark,	117
Accidents on country roads,	676
Accidents on city or town streets,	55

PROBATION.

During the year, 31 chauffeurs or operators reported, according to the terms of their probation, to a representative of this department. Of this number, 21 fully complied with such terms, while 10, for violating their probation agreement, had their licenses either suspended or revoked. In four cases the Board, after a period of suspension, reinstated the licenses.

Comparison of Analysis of Abstracts of Court Records for the Fiscal Year 1914 with the Fiscal Year 1915.

	1914.	1915.
Number of courts that have forwarded abstracts,	83	85
Total number of abstracts received,	5,491	7,260
Persons guilty of operating unlawfully,	4,951	6,522
Persons not guilty of operating unlawfully,	212	278
Cases appealed to higher court,	492	617
Complaints placed on file,	1,148	1,842
Complaints <i>not pressed</i> ,	226	303
Defendants defaulted,	20	50
Persons committed to imprisonment,	31	52
Complaints brought:		
For manslaughter,	10	15
For overspeeding,	2,039	2,506
For reckless operating,	143	150
For operating while intoxicated,	198	283
For using automobile without authority,	72	130
For endangering lives and safety of the public,	72	112
For failing to stop after causing injury,	54	48
For improper display or no register number,	103	185
For operating without a license,	377	731
For operating without carrying registration certificate,	126	185
For operating an unregistered motor vehicle,	94	94
For refusing to stop when signaled by officer,	121	171
For operating with unlighted lamps,	251	356
For violations of park rules,	133	156
For failing to give signal when approaching intersecting way,	1,177	1,455
For miscellaneous offences,	727	983

Fines, etc., as shown by Court Abstracts.

	1914.	1915.
For violating State statutes,	\$33,654 00	\$41,474 00
For violating metropolitan park rules,	1,010 00	713 00
For cost of court,	1,616 94	2,021 65
Totals,	\$36,280 94	\$44,208 65

Respectfully submitted,

F. L. AUSTIN,
Chief Examiner and Inspector.

DEC. 16, 1915.

APPENDIX B.

RELATING TO THE CARE OF SHADE TREES ON STATE HIGHWAYS.

List of the Towns in which Work has been done by the State Forester's Department, in cleaning and spraying Trees on State Highways for suppressing Gypsy and Brown-tail Moths and Elm Leaf Beetles, and the Amount expended in Each Town.

Acton,	\$202 00	Deerfield,	\$11 60
Agawam,	28 50	Dennis,	16 20
Amesbury,	32 74	Dover,	82 04
Amherst,	25 00	Dracut,	60 10
Andover,	61 35	Duxbury,	30 02
Ashburnham,	95 25	Easthampton,	14 28
Ashby,	43 50	Essex,	16 00
Ashland,	68 88	Falmouth,	100 45
Athol,	24 50	Fitchburg,	133 58
Auburn,	29 70	Foxborough,	94 65
Ayer,	25 25	Framingham,	110 55
Barnstable,	65 84	Franklin,	40 25
Barre,	49 35	Gardner,	13 50
Bedford,	43 46	Gloucester,	51 10
Bellingham,	10 20	Grafton,	97 75
Beverly,	166 99	Greenfield,	30 40
Billerica,	77 15	Groton,	27 75
Bourne,	155 00	Groveland,	38 84
Boxborough,	165 90	Hadley,	65 00
Braintree,	20 00	Hamilton,	80 64
Brewster,	182 25	Hardwick,	6 60
Bridgewater,	21 42	Harvard,	54 37
Brookfield,	61 22	Harwich,	110 10
Burlington,	108 87	Haverhill,	117 18
Canton,	23 50	Hingham,	22 69
Charlton,	20 36	Holbrook,	12 00
Chatham,	8 65	Holliston,	22 92
Chelmsford,	94 35	Hudson,	37 89
Chester,	34 25	Huntington,	35 15
Chicopee,	37 50	Ipswich,	37 05
Cohasset,	53 89	Kingston,	23 52
Concord,	243 76	Lakeville,	12 48

Lancaster,	. . .	\$33 33	Scituate,	. . .	\$84 50
Leicester,	. . .	29 00	Shirley,	. . .	13 45
Leominster,	. . .	45 10	Shrewsbury,	. . .	79 80
Lexington,	. . .	88 85	Somerset,	. . .	207 15
Lincoln,	. . .	67 95	South Hadley,	. . .	73 60
Littleton,	. . .	64 22	Southborough,	. . .	55 08
Lowell,	. . .	49 51	Spencer,	. . .	21 05
Lunenburg,	. . .	83 85	Sterling,	. . .	77 75
Marion,	. . .	14 00	Stockbridge,	. . .	97 35
Marlborough,	. . .	202 20	Stoneham,	. . .	91 58
Marshfield,	. . .	71 21	Stoughton,	. . .	19 25
Mashpee,	. . .	21 41	Sudbury,	. . .	147 90
Melrose,	. . .	15 40	Sutton,	. . .	11 85
Merrimac,	. . .	33 17	Swansea,	. . .	131 00
Methuen,	. . .	64 60	Templeton,	. . .	40 12
Middleborough,	. . .	37 37	Tewksbury,	. . .	84 00
Middleton,	. . .	11 88	Townsend,	. . .	84 65
Millbury,	. . .	15 95	Tyngsborough,	. . .	156 75
Monson,	. . .	5 64	Ware,	. . .	44 75
Montague,	. . .	22 60	Warren,	. . .	62 11
Natick,	. . .	75 29	Wayland,	. . .	77 63
Needham,	. . .	46 40	Webster,	. . .	17 33
Newbury,	. . .	63 87	Wellfleet,	. . .	32 75
Newburyport,	. . .	25 26	Wenham,	. . .	100 61
North Andover,	. . .	150 78	West Boylston,	. . .	66 56
North Attleborough,	. . .	60 50	West Bridgewater,	. . .	19 80
North Reading,	. . .	45 00	West Brookfield,	. . .	37 59
Northborough,	. . .	113 56	West Newbury,	. . .	105 16
Northbridge,	. . .	17 50	West Springfield,	. . .	35 00
Northfield,	. . .	75 50	Westborough,	. . .	31 05
Norwood,	. . .	74 64	Westfield,	. . .	55 00
Oxford,	. . .	27 41	Westford,	. . .	132 55
Palmer.	. . .	57 23	Westminster,	. . .	17 70
Pembroke,	. . .	21 00	Weston,	. . .	84 40
Pepperell,	. . .	89 89	Westwood,	. . .	21 42
Plainville,	. . .	2 10	Weymouth,	. . .	80 68
Princeton,	. . .	6 25	Wilbraham,	. . .	20 16
Quincy,	. . .	29 60	Williamstown,	. . .	82 50
Reading,	. . .	100 00	Wilmington,	. . .	65 18
Rochester,	. . .	32 21	Winchester,	. . .	59 60
Rockland,	. . .	27 14	Woburn,	. . .	151 91
Rockport,	. . .	9 89	Worcester,	. . .	13 33
Rowley,	. . .	69 10	Yarmouth,	. . .	136 00
Russell,	. . .	24 00			
Salisbury,	. . .	83 63			\$9,231 82
Sandwich,	. . .	12 00			

APPENDIX C.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION AND CONSTRUCTION EXPENDITURES TO DEC. 1, 1915.

TOWN OR CITY.	Year.	ROADS LAID OUT.		Length (Miles).	Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1915.
		From —	Direction.			
Abington,	1900-1-3,	Brockton line,	Easterly,	.1.73	1.74	
Abington,	1905-7,	Holbrook line,	Easterly,	1.64	1.64	
Abington,	1911,	Weymouth line,	Southerly,	1.05	1.05	\$5,969 13
Abington,	1913,	North Abington,	Southwestly,	1.08	1.08	
Abington,	1915,	Whitman line to Maple Street,	Northeastly,	1.53	1.53	
Acton (Great Road), ¹	1899-1900-1-2,	Concord line to Littleton line,	Northwesternly,	3.71	3.71	83,030 25
Acton (Harvard Pike),	1901-7-12-13,	Boston-Borough line to Concord line,	Easterly,	3.97	3.97	
Acuilnet,	1901-3,	Rochester line to Rochester line via Long Plain,	Westerly and northerly,	2.80	2.80	
Acuilnet,	1897,	New Bedford line,	Northerly,	.61	.61	
Adams (Maple Grove),	1897,	Chestnut line,	Northerly,	.57	.57	
Adams (Orchard Street),	1908,	Cheshire line,	Northerly,	1.46	1.46	24,398 58
Agawam,	1903-4-6-7-9-11,	South end bridge to Connecticut line,	Southerly,	3.90	3.90	46,838 78
Amesbury,	1899-1901-3-4,	Merrimac line,	Easterly,	2.25	2.25	
Amesbury,	1900-7-12,	Salisbury line,	Westerly,	1.05	1.05	38,043 13
Amherst,	1901-4,	Hadley line,	Northeastly,	.97	.97	
Amherst,	1912,	Pleasant Street,	Northwesterly,	.80	.80	44,411 01
Amherst,	1915,	South Hadley line,	Northerly,	2.30	2.00	
Amherst,	1905-6,	Lawrence line,	Southerly,	1.22	1.22	45,153 02
Audover,	1897-9-1900-2-3,	North Reading line,	Northerly,	2.97	2.97	
Ashburham,	1911,	New Hampshire State line,	Southeasterly,	.67	.67	12,436 20
Asilby,	1894-5-6-7-8-9,	Fitchburg line to Ashby post office,	Northerly,	3.57	3.57	75,884 82
Asilby,	1910-11-12,	Townsend line to Ashby post office,	Southwestly,	1.62	1.52	
Asilfield,	1897-8,	One mile north of Ashfield post office,	Northerly,	1.61	1.61	35,282 05
Asilfield,	1903,	Southborough line,	Easterly,	1.47	1.47	
Asilfield,	1910,	Framingham line,	Southerly,	1.73	1.73	13,822 90

Athol,	1895-6,	Orange line,	Easterly,	1.61	40,042 73
Athol,	1902-3,	Phillipson line,	Northwest by Northwest,	1.49	2,49
Attleboro,	1900-1-3,	North Attleborough line to Rhode Island line.	Southwest by Southwest,	2.65	2,65
Attleboro,	1909,	Norton line,	Northwest by Northwest,	.74	20,722 11
Auburn,	1895-6-7-8-9-1901-3-4,	Worcester line to Oxford line,	Southwest by Southwest,	.74	
Avon,	1914,	Brockton to Avon Square,	North by North,	5.28	70,089 83
Ayer,	1912,	Littleton line to Littleton line,	Southeast by Southeast,	1.31	10,639 69
Barnstable (north),	1913-14,	Shirley line,	Southeast by Southeast,	1.13	21,153 15
Barnstable (north),	1899-1902-7-10-11,	Yarmouth line,	North by North,	1.52	1.32
Barnstable (south), ²	1897-1901,	Sandwich line,	West by West,	1.91	1.91
Barnstable (south), ²	1904,	Yarmouth line,	West by West,	5.49	5.49
Barnstable (west),	1914,	Marsden Mills,	South by South,	2.26	2.26
Barnstable,	1887-9,	Sandwich line,	South by South,	1.48	1.48
Barre,	1902-4-5-6-8,	Ware River to Barre Common,	Northwest by Northwest,	.04	.04
Becket,	1910,	Cheshire line,	West by West,	2.89	29,337 12
Becket,	1912-13,	Point on Becket-Lee Road,	West by West,	5.56	5.56
Becket,	1897-1902,	West Becket Cemetery to Lee line,	Northwest by Northwest,	.59	165,161 53
Bedford,	1903-6,	Lexington line,	Northwest by Northwest,	2.75	2.75
Bedford,	1900-1-2-7-8-14,	Carlisle bridge,	South by South,	1.07	1.07
Belchertown,	1902-5,	Near depot to Granby line,	West by West,	.58	22,145 82
Bellingham,	1904-5-6,	Blackstone line to Mendon line,	Northwest by Northwest,	3.23	23,557 05
Bellingham,	1906-13,	Lakeville line to Taunton line,	West by West,	.55	.55
Berkeley,	1911,	Falls River to Gil line,	Northwest by Northwest,	2.63	22,866 35
Bernardston, ³	1915,	Vermont line to Bernardston village,	East by East,	1.26	11,392 50
Bernardston,	1895-7-8,	Wenham line,	South by South,	2.70	2.70
Beverly,	1905-6,	Manchester line,	South by South,	2.49	27,438 87
Beverly,	1908,	Near "Common,"	Southwest by Southwest,	2.01	2.01
Billerica,	1899-1900-2-9,	Uxbridge line to Woonsocket line,	South by South,	3.67	34,166 31
Blackstone,	1905,	Bellingham line to Woonsocket line,	South by South,	3.58	7,132 37
Blackstone,	1908,	Dedham line to Lagrange Street,	North by North,	3.67	3.67
Boston,	1897-8-1904-14,	Cohasset Narrows,	North by North,	.06	54,556 86
Bourne, ⁴	1903-5-10-11,	Back River bridge,	East by East,	1.40	14,40
Bourne, ⁵	1913-14,	Plymouth line,	South by South,	4.34	4.34
Bourne,	1915,	Easterly end of 1914 layout to Concord bridge.	South by South,	5.30	5.30
Bourne,	1915,	South by South,	South by South,	2.18	2.18
				1.02	1.02
				74,535 37	
				.06	.06

⁴ Exclusive of 185 feet at the "trench."⁵ Exclusive of 275 feet at railroad crossing.³ Exclusive of 143 feet at Boston & Maine bridge.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC. — *Continued.*

TOWN OR CITY.	YEAR.	ROADS LAID OUT.			Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1915.
		From —	—	Direction. —		
Boxborough,	1897-0-1906-7,	Acton line to Harvard line,	Northwestly,	—	3.31	\$20,568 34
Braintree,	1900-2,	Quincy line to Hor River,	Southeastly,	—	1.06	1.06
Braintree,	1915,	Holbrook line,	Northeastly,	—	1.41	1.10
Browster,	1895-6-7-1901,	Dennis line to Orleans line,	Easterly,	—	7.78	20,198 59
Browster,	1908,	Orleans line to Chatham line,	Southerly,	—	0.78	31,068 00
Bridgewater,	1904-5-6-7-8,	Taunton River,	Northwestly,	—	0.04	0.04
Brimfield,	1897-0,	Monsom line,	Northerly,	—	3.47	25,481 79
Brimfield,	1901-2,	Wales line,	—	2.34	2.34	
Brockton,	1897-8-9,	Easton line,	Northerly,	1.63	1.63	
Brockton,	1900,	Abington line,	Easterly,	1.87	1.87	
Brockton,	1904,	West Bridgewater line,	Westerly,	—	.66	.66
Brockton,	1914,	Shoughton line,	Northerly,	—	.66	.66
Brockfield,	1897-8-1900 2-3-4,	West Brookfield line to Brookfield village,	Southeastly,	—	.60	.60
Brockfield,	1905-7,	Spencer line,	Easterly,	3.12	3.12	
Brockfield,	1912,	North Brookfield line to railroad,	Southerly,	—	.77	.77
Buckland,	1894-6-0-7-8-9-1900 3-7,	Shelburne Falls station,	Westerly and southerly,	—	.74	54,012 93
Buckland,	1913,	Scotts bridge,	Southeastly,	—	4.28	4.28
Burlington,	1903-4-5-6,	Woburn line to Billerica line,	Northwestly,	—	.02	66,993 77
Canton,	1905-6-7-8,	Slaughton line,	Northerly,	—	.02	.02
Charlemont,	1897-8-9-1913,	Deerfield River bridge,	Easterly and southerly,	—	3.80	34,809 50
Charlemont,	1912-13-14,	Point on West Road,	Southerly,	—	3.23	25,556 28
Charlemont,	1914,	Savoy line,	Easterly and southerly,	—	.77	.77
Charlemont,	1915,	Connecting road between bridges,	—	—	.31	.31
Charlemont,	1915,	Easterly end of 1899 section,	Easterly,	—	2.66	2.66
Charlemont,	1913,	Scotts bridge,	Northwestly,	—	1.59	1.59
Charlemont,	1901-2,	Charlton Depot to Charlton City,	Southerly,	—	1.92	1.92
Charlton,	1905-6-7-10-11-12,	Oxford line to Charlton City,	Southwestly,	—	.30	.30
Charlton,	1909-13-14,	Near Charlton City to Southbridge Street,	Southerly and southwesterly,	—	1.91	1.91
Charlton,	1915,	End of the 1914 section,	Southerly to Southbridge line,	—	4.84	4.84
Chatham,	1899-1901-2-5-6,	Depot Street to Harwich line,	Westerly,	—	2.26	2.26
Chatham,	1907,	Depot Street to Harwich line,	Northwesterly,	—	.80	.80
Chelmsford,	1898-1901-7-10,	Lowell line to Tyngsborough line,	Westerly and northerly,	—	4.04	4.04
Chelmsford,	1903-4,	Lowell line towards Chelmsford Center,	Southwestly,	—	3.13	3.13
Chelmsford,	1908-11,	Westford line,	Northeastly,	—	2.42	2.42
Chelmsford,	1915,	Lowell line to Billerica line,	Southerly,	—	2.52	2.52

Chelsea,		Lewis Street and Eastern Avenue,	Southwesterly,	.96	9,088	76
Cheshire,		Lanesborough line to Adams line,	Northeasterly,	6.67	6.62	74,452
Chester,		Bucket line to Huntington line,	Southeasterly,	6.62	6.62	200
		Springfield line,	Northery,	.92	2.97	51,683
		Chicopee River,	Southwesterly,	.92	2.97	79
		1897-8-9,	Northery,	2.97	2.97	
		1902-3-4-5-6-7,	Southeasterly,	7.80	7.80	26,673
		West Tisbury line to Gay Head line,	Northesterly and northerly,	.97	.97	36
		North Adams line,	Northery,	.97	.97	
		Red Mill bridge,		.12	.12	
		Mountain Road,		.12	.12	
		Near Hingham line,	Easterly,	1.73	1.73	
		Beechwood Street to Scituate line,	Southerly,	.55	.55	
		Shelburne line,	Northwesterly,	2.13	2.13	
		Lincoln line,	Southeasterly,	1.47	1.47	
		Action line, Great Road,	Southeasterly,	2.12	2.12	
		Acton line, Harvard turnpike,	Easterly,	.60	.60	
		Pittsfield line,	Southeasterly,	2.66	2.66	
		Ipswich River bridge on Andover Street,	Westerly,	.69	.69	
		New Bedford line to Westport line,	Southerly,	4.74	4.74	
		Boston line,	Southerly,	.03	.03	
		Westwood line,	Southerly,	.80	.80	
		Southerly end of bridge over Charles River,	Southerly,	1.26	1.26	
		Northerly end of the 1913 section,	Northerly,	.27	.27	
		South Deerfield to Sunderland bridge,	Southeasterly,	1.53	1.53	
		Cheapside bridge, Deerfield River,	Southerly,	1.44	1.44	
		Whately line to Deerfield village,	Northery,	4.87	4.87	
		Yarmouth line to Brewster line,	Northeasterly,	4.27	4.27	
		Bass River to Harwich line,	Easterly,	3.23	3.23	
		Taunton line to Rehoboth line,	Southeasterly and southerly,	1.36	1.36	
		Taunton to near Somerset line,	Southeasterly,	1.59	1.59	
		Sutton line to Manchaug,	Southeasterly,	.54	.54	
		Main Street,	Westerly,	2.18	2.18	
		Charles River,	Northeasterly,	1.83	1.83	
		Near Lowell line on Methuen Road,	Northeasterly,	3.26	3.26	
		Lowell line,	Southeasterly,	2.29	2.29	
		Near Webster line,	Southeasterly,	5.16	5.16	
		Marshfield line to Kingston line,	Southeasterly,	1.83	1.83	
		Fembroke line,	Southeasterly,	1.93	1.93	
		End of 1914 section to Kingston line,	Southerly,	6.46	6.46	
		Wellfleet line to Orleans line,	Southerly,	1.32	1.32	
		Northampton line,	Northery,	1.10	1.10	
		Mt. Tom at Clark Street,	Northwestery,	.35	.35	
		Holyoke line,				

¹ Exclusive of 1,000 feet at railroad crossing.
² Exclusive of 800 feet at railroad crossing.

³ Exclusive of 120 feet at railroad crossing.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	ROADS LAID OUT.			Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1915.
		From —	Direction.	Length (Miles).		
East Longmeadow,	1904-6-10, .	Springfield line to village,	Southeastly,	1.80	1.80	\$10,807 05
Baston,	1900, .	Brockton line,	Southwesterly,	.80	.80	4,367 93
Edgartown,	1897-9-1900-1-2-3,	Oak Bluffs line,	Southwesterly,	2.42	2.42	17,478 26
Egremont,	1915, .	New York line,	Southeasterly,	2.24	2.24	—
Erving,	1898-9-1900-11-12,	Orange line,	Northwesterly,	2.86	2.86	—
Irving,	1907-9-10-14, .	Millers Falls to Erving village,	Easterly,	5.26	5.26	76,972 52
Essex, .	1902-3,	Bisson River,	Easterly and westerly,	.35	.35	—
Fairhaven,	1912, .	Gloucester line,	Westerly,	1.11	1.11	25,630 77
Fairhaven,	1894-5,	Mattapoisett line,	Westerly,	1.45	1.45	14,366 33
Fall River,	1915, .	Brightman Street bridge approach,	—	.03	.03	122 03
Falmouth,	1904, .	Bourne line to Woods Hole,	Southwesterly,	11.66	11.66	—
Falmouth,	1905-6-7-8-9-10, .	East Falmouth to Waquoit,	Easterly,	3.90	3.90	41,938 46
Fitchburg,	1894-5,	Westminster line,	Easterly,	.97	.97	—
Fitchburg,	1897, .	Lunenburg line,	Westerly,	.60	.60	51,143 73
Fitchburg,	1900-1-3-4, .	Ashby line,	Southwesterly,	2.55	2.55	—
Florida,	1913, .	Savoy line,	Easterly,	.03	.03	19,425 65
Florida,	1914, .	North Adams line,	Southeasterly,	7.21	7.21	—
Foxborough,	1901-2, .	Mansfield line,	Northerly,	1.81	1.81	—
Foxborough,	1905-8,	Wrentham line,	Southeasterly,	1.70	1.70	19,537 02
Framingham,	1904-5,	Southborough line; Pleasant Street,	Southeasterly,	2.42	2.42	—
Franklin,	1910, .	Ashland line; Hollis Street,	Northerly,	.79	.79	17,261 67
Franklin,	1905-7-10, .	Bellingham line,	Northeasterly,	2.68	2.68	—
Freetown,	1911, .	Wrentham line,	Northwesterly,	1.18	1.18	29,713 89
Freetown,	1902-3,	New Bedford line to Lakeville line,	Northerly,	3.19	3.19	—
Freetown,	1908, .	Fall River line to Assonet,	Northeastly,	18,534 71	18,534 71	—
Gardiner,	1897-8,	Tompson line,	Easterly,	.68	.68	—
Gardiner,	1900-1,	Westminster line,	Northwesterly,	2.38	2.38	44,501 78
Gay Head,	1913, .	Chilmark line,	Northwesterly,	.98	.98	—
Gill,	1912, .	Bernardston line to Northfield line,	Northwesterly,	3.14	3.14	24,779 09
Gloucester,	1894-5-8-1905-6-7,	Manchester line to "Cut bridge,"	Easterly,	.28	.28	4,552 20
Gloucester,	1907, .	Rockport line,	Northerly,	3.46	3.46	—
Goshen,	1915, .	Esses line,	Southerly,	.62	.62	67,432 39
Williamsburg line,	1894-5-8, .	Williamsburg line,	Easterly,	1.00	1.00	2.46
		Northwesterly,	Northwesterly,	2.46	2.46	46,440 20

Grafton,	1897-9-1900-5-12-13-14, 1915,	Millbury line, Southerly end of 1914 section,	5.79 .71	76,821 65 .71
Granby,	1894-1902-5-6-8, 1911-13-14,	South Hadley line, North Street to Belchertown line,	2.26 3.21	65,094 67 1.50
Granby,	1915,	South Hadley line,	2.03	2.03
Great Barrington,	1894-6-7-1902, 1899-1900-2, 1903-6-7-8-10-14, 1905,	Housatonic River bridge, Washington Street,	3.41 1.42	44,918 18 1.42
Greenfield, Greenfield, Groton, Groveland,	1901-2-7, 1914,	Bernardston line, Point on Colrain Road, Pepperell line,	3.77 1.26 1.41	45,373 14 2.26 26,232 72
Hadley,	1894-1904, 1899-1900, 1909-10,	Merrimac River bridge to West Newbury line, Connecticut River to Amherst line, Ipswich line, Wenham line,	1.11 1.72 1.72	22,613 35
Hamilton,	1895-6-8-9, 1906-8,	Pittsfield line to New York State line, Fenbroke line,	1.22 3.23	25,771 20 3.23
Hanover,	1897-1901, 1900-5-10,	New Brattleboro line, Buxborough line to Harvard Common, Dennis line to Chatham line,	1.85 1.82 2.31	51,949 14 9,041 43 29,361 41
Harvard,	1899-1900-1-2-3, 1898,	Chatham line to Browster line, Northampton line to Whately line,	5.10 1.38	5.10 1.38
Harwich,	1901-6-8-9-10-11, 1902-7-10,	Kenoza Road to Merrimac line, River and Maxwell Streets to Methuen line,	3.54 2.66 2.63	52,135 67 2.66 2.63
Hathfield,	1899,	North Andover line, . . . . .	.43	83,475 14 .43
Haverhill,	1912,	Weymouth Back River,	1.42	16,305 31
Haverhill,	1894,	Near Cohasset line,	1.24	1.24
Hingham,	1896-7,	Dalton line,	1.02	13,488 38
Hinsdale,	1901-2-3, 1894-6-1902, 1898-1900-8, 1915,	Weymouth line,	1.75 4.21	15,373 19 4.21
Holden,	1905,	Worcester line to Jefferson village, Connecting 1897 and 1908 sections, . . . . .	.70 .52	.70 67,515 00
Holden,	1915,	Futland line,	1.51	1.51

¹ Exclusive of 1,000 feet at railroad crossing.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	ROADS LAID OUT.			Length constructed (Miles).	Construction Expenditures to Dec. 1, 1915.
		From —	Direction.	Length (Miles).		
Holliston,	1906-7-10,	Milford line,	Northeasterly,	3.32	\$45,213 45	
	1911-12,	Ashland line,	Southerly,	1.61	1.61	
Holliston,	1905-6-10,	Easthampton line,	Southerly,	4.17	22,649 41	
Holyoke,		Brigham Street to Marlborough line,	Southerly,	1.14	8,142 03	
Hudson,	1906-7,	Russell line,	Westerly,	1.01	—	
Huntington,	1895-6,	Chester line,	Southeastery,	1.25	1.25	
Huntington,	1903-6-9,	Ipswich line to Ipswich Common,	Northerly,	2.13	2.13	
Ipswich, ¹	1907-8-9,	Bowley line,	Southerly,	2.29	2.29	40,622 73
Ipswich, ¹	1910-11,	Duxbury line,	Southerly,	1.02	1.02	7,362 67
Kingston,	1905-6,	Near Middleborough line,	Southwesterly,	3.57	3.57	
Lakeville,	1901-2,	Freetown line to Berkley line,	Northwesterly,	4.79	4.79	56,005 53
Lakeville,	1910-11-12,	Clinton line to Storling line,	Northerly,	1.25	1.25	7,342 74
Lancaster, ²	1902,	Cheshiro line to Pittsfield line,	Southerly,	2.29	2.29	
Lanesborough, ³	1911-12-13,	Methuen line,	Northerly,	.27	.27	25,192 42
Lawrence,	1896,	Methuen line,	Southwesterly,	.54	.54	
Lawrence,	1915,	Lee Park to Becket line,	Easterly and southeasterly,	5.14	5.14	
Lee,		Lenox line to Lee village,	Southerly,	1.26	1.26	
Lee,	1894-5-6-1908-9-12-13,	Lenox line to Stockbridge Street,	Southerly,	1.03	1.03	156,764 77
Lee,	1900,	Stockbridge line, Main Street,	Easterly,	.90	.90	
Lee,	1906,	Lee to South Lee,	Southwesterly,	2.38	2.38	
Lee, (south),	1906,	Worcester line to Spencer line,	Westerly,	—	—	
Lee,	1915,	Lee line to Lenox village, Walker Street,	Northerly,	4.87	4.87	
Leicester, ⁴	1904-5-6-8-9,	Pittsfield line to Lenox village,	Southerly,	2.28	2.28	
Lenox,	1899-1900-1,	Lenox line to Lenox village,	Northerly,	3.18	3.18	39,122 42
Lenox,	1904-5,	Lee line to Lenox village, Kemble Street,	Northerly,	2.20	2.20	
Lenox,	1906,	Sterling line,	Northerly,	2.18	2.18	
Leominster,	1901-2,	Northerly end of 1902 section,	Northerly,	.37	.37	28,659 14
Lexington,	1895-6-7-8,	Massachusetts Avenue,	Westerly,	3.44	3.44	
Lexington,	1899,	Bedford line,	Southeasterly,	.85	.85	37,862 09
Lincoln,	1895-6-7,	Lexington line to Concord line,	Northwesterly,	2.06	2.06	16,883 77
Littleton,	1902-3-4,	Acton line, Great Road,	Northerly,	2.65	2.65	
Littleton,	1912-13,	Westford line to Great Road,	Southwesterly,	.32	.32	36,235 12
Littleton,		Ayer line,	Southeasterly,	1.63	1.63	

APPENDIX C.

Lowell (boulevard),	1897,	Tynsbrough line,	Easterly,	.97	22,978 59
Lowell (Princeton Street),	1897-8,	Chelmsford line,	Easterly,	1.33	1.33
Lowell,	1900,	Tawksbury line,	Northwestly,	.35	.35
Lunenburg,	1898-9-1900-1-3-10-13,	Fitchburg line to Shirley line,	Easterly and southeasterly,	5.89	64,119 84
Lynn,	1898,	Saugus River to Sea Street,	Northeastly,	.90	.90
Lynn,	1914,	Lynnfield line,	Southeastly,	1.98	140,944 06
Lynnfield,	1914,	Lynn line,	Westerly,	.03	—
Mansfield,	1901,	Foxborough line,	Southeastly,	.72	10,068 19
Mansfield,	1906,	Norton line,	Northerly,	.49	.49
Marion,	1894-5-1911,	Marion village to Wareham line,	Northeastly,	1.59	—
Marion,	1897-9-1901-2,	Marion village to Mattapoisett line,	Westerly,	1.84	1.84
Marion,	1903,	Marion village to Rochester line,	Northwesterly,	2.14	31,202 66
Marion,	1914,	Northern end of 1897 section,	Northerly,	1.05	—
Marlborough (east),	1897-1902-3-4,	Sudbury line to Hosmer Street,	Westerly,	3.10	3.10
Marlborough (west),	1897-9-1900-1,	Northborough line,	Easterly,	2.42	74,096 31
Marlborough,	1908-11,	Hudson line,	Southerly and southwesterly,	1.27	1.27
Marshfield,	1894-1910,	Duxbury line to North River bridge,	Northeastly,	8.28	54,536 75
Mashpee,	1911-12-13-14,	Falmouth line to Barnstable line,	Northeastly,	5.74	36,399 77
Mattapoisett,	1894-5,	Fairhaven line,	Easterly,	1.16	24,528 57
Mattapoisett,	1900-1-3,	Marion line,	Westerly,	2.05	2.05
Medford,	1907,	Somerville line via Mystic Avenue,	Northerly,	.86	30,974 24
Melrose,	1906,	Saugus line, Upham Street,	Westerly,	.40	5,056 49
Merrimac,	1897-8-9-1910,	Haverhill line,	Easterly,	1.03	—
Merrimac,	1901-3,	Amesbury line,	Southwesterly,	1.20	23,486 74
Methuen,	1896-1908,	Lawrence line to Haverhill line,	Northeastly,	3.69	—
Methuen,	1912,	Dracut line,	Southwesterly,	1.19	63,567 30
Methuen,	1915,	Lawrence line, Water Street,	Southeastly,	1.42	1.42
Middleborough,	1894-1903,	Narragansett River to Rochester line,	Southerly,	8.98	8.98
Middleborough,	1906-7-8,	Bridgewater water line to railroad bridge,	Southeastly,	3.47	63,056 15
Middleton,	1912-13,	North Andover line,	Southeastly,	1.43	—
Middleton,	1914,	Southeastly end of 1913 section,	Southeastly,	1.23	39,269 55
Milford,	1904-5,	Hopkinton line via West Street,	Southwesterly,	1.75	31,163 99
Milford,	1909-10,	Holliston line,	Southeastly,	1.80	1.80
Millbury,	1902,	Worcester line to Grafton line,	Southerly,	.78	—
Millbury,	1900-3-4,	Worcester line to Main Street,	Northeastly,	1.61	28,157 11
Millbury,	1906,	Sutton line,	Northeastly,	.59	.59

¹ Exclusive of 67 feet at railroad bridge.² Exclusive of 1,100 feet at railroad crossing.³ Exclusive of 1,280 feet at railroad crossing.⁴ Exclusive of portions through Leicester village.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	ROADS LAID OUT.			Length constructed (Miles).	Construction Expenditures to Dec. 1, 1915.
		From —	Direction.	Length (Miles).		
Milton, ¹	1899-1900,				.87	\$11,344 26
	1894,				.93	.93
Monson,	1901-5,				.39	16,178 94
Monson,	1908,				.29	.29
Montague,	1898-9-1904-6-10,				4.05	4.05
Montague,	1905-9,				52,140 55	52,140 55
Nantucket,	1894-1903,				1.68	1.68
Natick,	1901,				6.48	6.48
Natick,	1903,				1.14	1.14
Needham,	1901,				2.06	2.06
Needham,	1905,				1.00	1.00
New Braintree,	1897,				1.03	11,313 34
New Braintree,	1903,				.17	.17
Newburyport,	1899-1900,				.23	3,944 07
Newburyport,	1896-7-8,				4.23	4.23
Newburyport,	1913,				1.75	33,540 45
Newton,	1901,				1.75	1.75
Norfolk,	1895,				.09	15,708 26
North Adams,	1900-1-2-3,				1.03	1.03
North Adams,	1913,				6,554 87	6,554 87
North Andover,	1900-2-4,				1.45	16,602 60
North Andover,	1907-10-11-12,				2.13	2.13
North Andover,		Osgood, Park, Pleasant and Court streets, to the Haverhill line.			2.35	2.35
North Andover,	1913-14,				3.65	3.65
North Andover,	1915,				3.71	3.71
Northampton,	1894,				141,129 54	141,129 54
Northampton,	1897-8-9-1900-5,				3.13	3.13
Northampton,	1912,				.66	.66
Northampton,	1915,				.56	.56
Northampton,					1.47	1.47
Northampton,					1.42	1.42
Northampton,					.84	.84
Northampton,					1.34	.30

North Attleborough,	1894-5-6-7-9,	Bruce Avenue to Attleboro line,	Southwesterly,	3.60	24,168 98
Northborough (east),	1897-8-1911,	Marlborough line,	Southwesterly,	1.80	1.80
Northborough (west),	1900-2-4,	Shrewsbury line,	Easterly,	2.10	32,539 96
Northborough (south),	1897,	Westborough line,	Northwesterly,	.47	.47
Northbridge,	1913-14,	Grafton line,	Southeasterly,	1.24	1.24
Northbridge,	1915,	Southerly end of 1914 section,	Southerly,	.83	.70
North Brookfield,	1905-6-7-8-10,	Brookfield line,	Northerly,	2.25	31,295 15
Northfield,	1901-2-12,	Bernardston line,	Northeasterly and easterly,	3.04	3.04
Northfield,	1912,	New Hampshire line to Pine Street,	Southerly,	1.24	1.24
North Reading,	1897-8-1901-3-11,	Andover line to Reading line,	Southerly,	2.54	2.54
Norton,	1906,	Mansfield line,	Southerly,	.50	.50
Norton,	1908-9-11,	Attleboro line to railroad station,	Easterly,	4.19	10,078 86
Norwood (south),	1897-8,	Walpole line,	Northerly,	1.03	1.03
Norwood (north),	1895-6,	Westwood line,	Southerly,	1.04	1.04
Oak Bluffs,	1894-5-6,	Sagamore bridge,	Northerly,	2.37	20,929 85
Orange,	1894-5-7,	Athol line,	Westerly,	2.18	2.18
Orange,	1900-1-3-4-5,	Erving line,	Easterly,	2.62	2.62
Orleans,	1900-1-4,	Brewster line to Eastham line,	Northeasterly,	1.98	53,029 74
Oxford,	1903-4-5,	Brewster line towards Shattocks Corner,	Northerly and northwesterly,	2.72	20,353 50
Oxford,	1906-7,	Auburn line,	Southwesterly,	.85	.85
Oxford,	1908-9,	Charlton line,	Northeastery,	1.34	34,866 61
Oxford,	1913-14,	Webster line,	Northeastery,	1.44	1.44
Palmer,	1899-900-1-13,	Tennyville to Monson line,	Southeasterly and westerly,	2.64	2.64
Palmer,	1905-8,	Near Quaboag River to Monson line,	Easterly,	5.29	129,400 36
Palmer,	1906-8-9,	Wilbraham line,	Easterly,	2.11	2.11
Paxton,	1895-1902,	Worcester line,	Northwesterly,	3.60	48,202 62
Pembroke,	1915,	Hanover line,	Southerly,	.35	.35
Pembroke,		Southerly end of 1905 section to Duxbury line.	Southeasterly,	3.99	3.50
Pepperell,	1907-10-11-14,	Nashua River bridge to Groton line,	Northwesterly,	3.58	29,626 15
Phillipston,	1897-902-4-9,	Athol line to Templeton line,	Easterly and northeasterly,	2.78	31,108 71
Pittsfield,	1894-8-1901-2-9-13,	Hancock line,	Easterly,	3.64	3.64
Pittsfield,	1897-1906-7,	Dalton line,	Southwesterly,	2.37	2.37
Pittsfield,	1904-5,	Lenox line,	Northerly,	1.58	1.58
Pittsfield,	1913,	Lanesborough line to Dalton Road,	Southerly,	1.47	1.47
Plainville,	1894-5-11,	Wrentham line to North Attleborough line,	Southerly,	2.30	6,075 98
Plainville,	1894-904-7-10-11-13-14,	Chittonville to Bourne line,	Easterly,	13.33	19,792 22
Princeton,	1897-1900-2-3,	Princeton Depot,	Westerly,	2.23	21,297 60
Provincetown,	1901-3,	Truro line to Allerton Street,		1.10	7,669 68

¹ Exclusive of 1,000 foot at railroad crossing.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC., — *Continued.*

TOWN OR CITY,	Year,	ROADS LAID OUT,		Length (Miles),	Length con- structed (Miles).	Construc- tion Ex- penditure to Dec. 1, 1915.
		From —	Direction,			
Quincy,	1809,			.40	.40	
Quincy,	1902-05,	Cambobk Street to Forn River bridge,	Northerly,	.06	.05	\$20,587 83
Quincy,	1904,	Braintree line,	Northerly,	1.23	1.21	
Randolph,	1902-3-9,	Rudolph line to Milton line,	Northerly,	1.90	1.90	45,020 74
Randolph,	1915,	Quincy line,	Southeastly,	1.90	1.90	
Randolph,	1901-2-3,	Avon line,	Northeastly,	1.84	1.70	
Taymouth,	1912-13,	Quinton line, Dean Street,	Northeastly,	1.48	1.48	
Taymouth,	1915,	Southwesterly end of Honkawock swamp,	Southwesterly and southwesterly,	2.68	2.68	52,770 19
Tewell,	1809-1900,	Thunton line,	Northerly,	1.50	1.50	
Tewell,	1915,	Northerly and of 1000' layout,	Northerly,	1.07	1.07	
Tewell,	1902-3,	North Reading line,	Northerly,	1.19	1.19	30,471 37
Tewell,	1805-1908,	Reservoir line to Dighton line,	Southwesterly,	2.67	2.67	
Wellesley,	1912,	Rowson line to Sudconk line,	Easterly,	6.63	6.63	59,008 98
Tewever,	1807-8,	Henton line,	Northwesterly,	.51	.51	
Tewever,	1809-1913,	Shangan line,	Northeastly,	.58	.58	
Tewever,	1913,	Point of Pines to Rayore Street,	Southwesterly,	1.11	1.11	152,427 66
Richmond,	1807-1907,	Rathord station to Pittfield line,	Southwesterly,	2.06	2.06	
Richmond,	1903,	Murion line to Acandine line,	Westerly,	4.02	4.02	
Rockbottom,	1900,	Middleborough line to Wareham line,	Southwesterly,	6.27	6.27	
Bonkland,	1902-5-6,	Arlington line to Hanover line,	Easterly,	.90	.90	
Ronkport,	1902-6-10,	Glocester line,	Northerly,	2.35	2.35	15,493 55
Towley,	1905-7-8-9,	Newbury line,	Southwesterly,	1.60	1.60	21,061 62
Towley,	1911,	Towish line,	Northerly,	2.90	2.90	
Russell,	1894-5-6-7-8-9,	Westfield line to Huntington line,	Northeastly,	.74	.74	22,115 74
Rutland,	1904,	Hilton line,	Northeastly,	6.66	6.66	15,291 98
Salem,	1901-9,	Swampscott line,	Northeastly,	1.16	1.16	8,301 30
Salem,	1914,	Lovin line,	Northeastly,	1.40	1.40	45,894 41
Salisbury,	1904-5-12,	Shambury Village to Newburyport bridge,	Southwesterly,	1.01	1.01	
Salisbury,	1910,	New Hampshire line to village,	Southwesterly,	1.56	1.56	
Salisbury,	1911-12,	Amesbury line,	Southwesterly,	2.41	2.41	69,305 72
Salisbury,	1913-14,	Salisbury Square to Salisbury Beach,	Southwesterly,	1.74	1.74	
				2.17	2.17	

Sandwich,	1897-8-1900-2-10-12-13,	Barnstable line to Bourne line,	Westerly and northwesterly,	7.13
Sandwich,	1914,	Mashpee line to Barnstable line,	Southeastery,	.11
Saugus,	1899-1913,	Foxhill bridge to Revere line,	Southeastery,	.164
Saugus,	1900-14,	Milrose line to Newburyport turnpike,	Southeastery,	.86
Savoy,	1913,	Florida, and Savoy at Cold River,	Southerly,	.04
Savoy,	1914,	Florida line to Charlton line,	Southerly,	.04
Seituate,	1894-1910,	Cotasset line to Marshfield line,	Westerly,	.76
Seekonk,	1910-1-2-4,	Rehoboth line to Rhode Island line,	Southeastery,	.37
Seekonk,	1910-11-13,	Perry Avenue to Rehoboth line,	Northeastery,	.27
Sharon,	1908,	Foxborough line,	Northeastery,	.27
Sheffield,	1912-13-14,	Connecticut line via under Mountain Road,	Northeastery,	.04
Sheffield,	1915,	Northern end of 1914 section,	Northerly,	.29
Sheffield,	1914,	Connecticut line via Ashley Falls Road,	Northerly,	.86
Sheffield,	1915,	Northern end of 1914 section,	Northerly,	-
Sheffburno,	1894-5-6,	Bridge Street to Colrain line,	Northeastery,	.54
Shirebury,	1913-14,	Ayer line to Lunenburg line,	Westerly,	.36
Somerset,	1895-1904,	Worcester line to Northborough line,	Northeastery,	.16
Somerset,	1895-1910,	Slades Ferry bridge,	Northerly,	.21
Somerset,	1903-4-9,	Slades Ferry bridge to Swansea line,	Northeastery,	.36
Somerset,	1909-15,	Riverside and Braxton Avenue,	Northerly,	.21
Somerset,	1914,	Junction of Riverside and Braxton avenues,	Westerly,	.16
Somerset,	1915,	End of 1914 section to Swansea line,	Northwesterly,	.37
Somerville,	1908,	Medford line via Mystic Avenue,	Southeastery,	.50
Somerville,	1914,	Junction of Middlesex and Mystic avenues	Northerly,	.86
		to Fellsway Boulevard.	Southerly,	.58
		Easthampton line,	Easterly,	.44
		Worborough line,	Westerly,	.28
		Ashland line,	Southwesterly,	.86
		Framingham line,	Southwesterly,	.65
		Charlton line,	Easterly,	.15
		Sturbridge line,	Southwesterly,	.15
		Granby line to South Hadley Falls,	Southwesterly,	.91
		South Hadley Falls to Granby line,	Northesterly,	.45
		Amherst line to Granby line,	Southerly,	.45
		Leverett line,	Westerly,	.91
		Brookfield line to Seven Mile River bridge,	Easterly,	.45
		Near town hall to West Boylston line,	Southerly,	.45
		Laneaster line to village,	Southwesterly,	.45
		Leominster line,	Southerly,	.45
				.05

ⁱ Exclusive of 220 feet at railroad bridge.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY	Year.	ROADS LAID OUT.		Length constructed (Miles).	Construction Expenditures to Dec. 1, 1916.
		From —	Direction.		
Stockbridge,	1905-9,	Lee line to South Lee,	Westerly,	1.06	\$23,537 43
Stockbridge,	1906,	Lee line to East Street,	Southwesterly,	2.24	2.24
Stoneham,	1907-8,	South Street,	Northorly,	.57	14,944 94
Stoneham,	1909-1,	Reading line,	Southorly,	1.01	1.01
Stoughton, ¹	1902-3,	Canton line to Lincoln Street,	Southerly,	1.16	1.16
Stoughton, ¹	1904-5,	Easton line to Walnut Street,	Northwesterly,	2.14	2.14
Stoughton, ¹	1914,	Brockton line, Park Street,	Northorly,	1.32	1.32
Stoughton, ¹	1915,	End of 1914 section,	Northwesterly,	.94	.94
Starbridge,	1897-1903-4-7-9,	Southbridge line,	Northwesterly,	2.36	2.36
Starbridge,	1897-8-1000-1-2-3,	Marlborough line to Wayland line,	Easterly,	5.11	36,930 44
Sudbury,	1897-8-1000-4-5-7-9-13-14,	Connecticut River bridge to Amherst line,	southerly,	3.97	3.97
Sutton,	1899-1901-2,	Milbury line,	Southorly,	1.46	1.46
Swampscott,	1903-4,	Douglas line at Manchigian,	Northorly,	.82	.82
Swansea,	1897-1900-4,	Salem line to Barrill Street,	Southwesterly,	1.49	1.49
Swansea,	1903-4-7-9-10-11-12,	Somerset line to Rehoboth line,	Northwesterly,	6.65	29,433 53
Taunton,	1895-6-8-9-1900-1,	Somerset line (Wilbur Avenue),	Easterly,	1.15	48,252 57
Taunton,	1895-6-13,	Dighton line, Winthrop Street,	Northorly,	2.94	2.94
Taunton,	1907-13,	Dighton line, Somerset Avenue,	Northwesterly,	1.79	1.79
Taunton,	1912,	Borden line,	Southerly,	1.33	1.33
Taunton,	1914,	Raynham line, Broadway,	Westerly,	.38	.38
Templeton,	1899-1901-2-3,	Lakeville line,	Westerly,	1.26	1.26
Templeton,	1905-6-7-8-9,	Gardner line at Otter River,	Northorly,	2.00	2.00
Towksbury, ²	1915,	Phillipston line to Baldwinville,	Southeasterly,	3.60	66,596 58
Tisbury, ²	1894,	Lowell line to Wilmington line,	—	6.00	6.00
Tisbury, ²	1896-1911,	Connecting 1901 layouts,	Southwesterly,	.19	.19
Townsend,	1893-1906,	Vineyard Haven to West Tisbury line,	Westerly,	1.93	14,613 71
Truro,	1915,	Groton line to Ashby line,	Northorly,	6.04	46,953 05
Truro,	—	Wellfleet line via Kelley's Corner,	Northwesterly,	3.16	3.16
Truro,	—	Kelley's Corner,	—	4.47	55,077 06
				2.50	

APPENDIX C.

Tynsborough,	1895-6,	Tynsborough bridge to Lowell line,	Southeasterly and northwesterly,	2.95	2.95
Tynsborough,	1909-10-11-12-13,	New Hampshire line to Chelmsford line,	Southerly and northwesterly,	3.98	3.98
Uxbridge,	1897-8-1901-3-9-10,	Blackstone line to Blackstone River,	Northwesterly,	2.94	2.94
Uxbridge,	1912-14,	Northbridge line to Mumford River bridge,	Southwesterly,	1.18	1.18
Walton,	1901,	Brinfield line,	Northeastery,	1.04	1.04
Walpole (south), ³	1894-5-7-1900-12,	Norfolk line,	Northeastery,	3.06	3.06
Walpole (north),	1897-8-1900-11,	Norwood line,	Southerly,	1.97	1.97
Ware,	1897-9-1900-3,	New Braintree line,	Southerly,	2.28	2.28
Wareham,	1896-1901-6-7-10,	Junction of Palmer and Balchertown roads,	Northeastory,	1.90	1.90
Wareham,	1898-1901-13,	Weweantic River bridge to High Street,	Northeastery,	2.20	2.20
Wareham,	1905-6-7-8,	Colusset Narrows bridge,	Westerly and southwesterly,	1.98	1.98
Wareham,	1910,	Parker's Mills to Rochester line,	Northwestery,	3.42	3.42
Wareham,	1896-7-8-1907-8,	Wareham Narrows bridge,	Easterly,	.88	.88
Warren,	1899-1900-1,	Warren village to Palmer line,	Westerly,	2.68	2.68
Watertown,	1895-6,	Warren village to West Brookfield line,	Easterly,	1.42	1.42
Wayland, ⁴	1897-1900-3,	Waltham line,	Easterly,	.85	.85
Webster,	1908-12,	Weston line to Sudbury line,	Westerly,	2.58	2.58
Webster,	1911,	Lake Street and Thompson Road to Con-	Southerly,	1.76	1.76
Webster,	1901,	nectic line.	Southerly,	.84	.84
Wellesley,	1903-4-5-7,	Oxford line,	Easterly,	1.18	1.18
Wellfleet,	1915,	Natick line to Blossom Street,	Northerly,	4.65	4.65
Wellfleet,	1897-1901-3,	Eastham line,	Northwesterly,	2.71	1.40
Wonham,	1903-6,	End of 1907 section to Truro line,	Northerly,	1.70	1.70
Westborough, ⁵	1897,	Beverly line to Hamilton line,	Southwesterly,	2.27	2.27
West Boylston,	1897-8,	Southborough line,	Southeasterly,	.72	.72
West Boylston,	1913,	Northborough line,	Southerly,	1.55	1.55
West Boylston,	1915,	Worcester line,	Southerly,	.80	.80
West Boylston, ⁶	1900-1-2-4,	Sterling line,	-	1.86	1.75
West Bridgewater,	1889,	Connecting 1913 and 1908 sections,	Southerly,	3.16	3.16
West Brookfield,	1899-1900-1,	Brockton line to Bridgewater line,	Southwesterly,	1.15	1.15
West Brookfield,	1905-13,	Ware line to Ware line,	Northwesterly,	1.51	1.51
West Brookfield,	1894-0-8-9,	Brookfield line,	Easterly,	1.16	1.16
Westfield,	1898-9-1900-1-2,	Warren line,	Westerly,	2.22	2.22
Westfield,		West Springfield line,	Easterly,	3.50	3.50

¹ Exclusive of 250 feet at railroad bridge.² Exclusive of 218 feet at Wamsut crossing.³ Exclusive of 175 feet at railroad bridge.⁴ Exclusive of 1,500 feet at railroad crossing and Concord River bridge.⁵ Exclusive of portions at two railway bridges.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC., — *Concluded.*

TOWN OR CITY.	Year.	ROADS LAID OUT.		Length (Miles).	Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1915.
		From —	Direction.			
Westford,	1902-12,	Littleton line to Chelmsford line,	Northwesterly and southwesterly,	4.15	4.15	\$14,422 98
Westford,	1903,	Minots Corner to Westford village,	Northwesterly,	.80	.80	
Westminster,	1894-5-7-8-9,	Fitchburg line,	Southwesterly,	3.00	3.00	
Westminster,	1903,	Gardner line,	Easterly,	2.25	2.25	
Westminster,	1915,	Fitchburg line to Ashburnham line,	Northwesterly,	2.27	2.27	
West Newbury,	1895-6-7-1903 4-5-6-9,	Newburyport line to Groveland line,	Westerly,	5.09	5.09	68,726 45
Weston,	1898-9,	Wayland line to near Stony Brook,	Easterly,	3.15	3.15	16,212 44
Westport, ¹	1894-6-7-8-1913,	Dartmouth line,	Westerly and southwesterly,	4.45	4.45	46,420 60
West Springfield,	1895-6-1905 6-12-13,	Westfield line,	Easterly,	3.07	3.07	32,944 46
West Tisbury,	1895-6-7-1904,	Tisbury line to Chilmark line,	Southwesterly,	5.35	5.35	30,084 55
Westwood,	1899-1900-13,	Norwood line to Dedham line,	Northwesterly,	1.07	1.07	8,080 05
Weymouth,	1894,	Holbrook line to Abington line,	Easterly,	2.25	2.25	
Weymouth,	1895-6-7,	Fox River to Back River,	Easterly,	1.75	1.75	
Weymouth,	1903-4-7-8-10,	Broad Street via Washington to Abington line.	Southerly,	4.94	4.94	49,834 71
Weymouth,	1915,	Hingham line,	Northwesterly,	2.15	2.15	
Whately, ²	1899-1901-2-3-4-5-6,	Dorfield line to Hatfield line,	Southerly,	4.03	4.03	30,048 21
Whitman,	1894-5-6,	Brockton line,	Easterly,	1.70	1.70	
Whitman,	1913-14,	East Bridgewater line to Abington line,	Northwesterly,	2.30	2.30	41,275 74
Whibraun,	1894-5-6-1901 3-4-13,	Springfield line to Palmer line,	Easterly,	5.07	5.07	54,921 16
Williamsburg,	1896-8-1901-3,	Cochon line,	Southeasterly,	2.65	2.65	34,038 22
Williamsburg,	1907,	River Road from village,	Southerly,	.13	.13	
Williamstown,	1895-6-8-1903,	North Adams line,	Westerly,	1.48	1.48	35,066 62
Wilmington,	1907-8-10-11,	Towkaway line,	Southwesterly,	3.68	3.68	37,046 52
Winchendon,	1907,	Glen Allen Road via Maple Street,	Southwesterly,	1.35	1.35	9,323 30
Winchendon,	1899-1900,	Millers' River bridge, River Street,	Southwesterly,	.35	.35	
Wincanton,	1897-1902-3-13,	Arlington line to Woburn line,	Northeastery,	1.90	1.90	15,475 81
Windsor,	1900-7,	Cummington line,	Westerly,	2.50	2.50	2,60
Windsor,	1915,	Cummington Road, Windsor post office, connecting 1906 and 1913 sections,	Easterly,	.88	.88	49,517 13
				—	—	1.41

Woburn,	1900-1-2,	Winchester line to Burlington line,	2.03
Woburn,	1912,	Wilmington line,	.58
Woburn,	1913,	North Main and Elm streets,	.40
Woburn,	1915,	Lexington line,	.99
Worcester,	1896-7,	Paxton line,	1.35
Worcester,	1897-1903,	Holden line,	1.50
Worcester,	1900-5,	West Boylston line,	1.22
Wrentham,	1897-8-9-1900-2-14,	Plainville line to Norfolk line,	4.94
Wrentham,	1912-13,	Franklin line,	2.04
Yarmouth (north),	1915,	Foxborough line,	2.55
Yarmouth (south),	1894-5-6,	Barnstable line to Dennis,	2.00
Yarmouth,	1895-6-7,	Barnstable line to Bass River bridge,	3.70
		Easterly,	5.09
		Eastery,	5.09

¹ See Dartmouth.² Exclusive of 375 feet at railroad crossing and 800 feet at railroad bridge.³ Exclusive of 300 feet at railroad bridge.

APPENDIX D.

TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE DURING THE YEAR 1915, AND RESIDENT ENGINEERS ON SUCH WORK, TOGETHER WITH DATES OF BEGINNING AND ENDING.

Town or City.	County.	Year.	Resident Engineer.	Date of Contract.	Date of Beginning, 1915.	Date of Ending, 1915.
Abington,	Plymouth,	1915,	Allan I. Dean,	May 25, 1915	May 26	Oct. 1
Abington,	Plymouth,	Surfacing,	Allan I. Dean,	May 4, 1915	June 24	Oct. 1
Ashburnham,	Hampshire,	1915,	Lewis R. Sellew,	Aug. 3, 1915	July 20	Dec. 4
Amherst,	Hampshire,	Surfacing,	Lewis R. Sellew,	April 26, 1915	April 26	July 16
Andover,	Essex,	Surfacing,	Frank A. Chase,	July 27, 1915	July 29	Oct. 16
Ashburnham,	Worcester,	Chapter 525,	E. N. Briggs,	Aug. 3, 1915	Aug. 19	Nov. 25
Ashby, .	Middlesex,	Surfacing,	E. N. Briggs,	April 21, 1915	May 10	Aug. 6
Avon, .	Norfolk,	1914,	Allan I. Dean,	Sept. 15, 1914	April 17	Aug. 5
Barre, .	Worcester,	Chapter 221,	R. H. Hosford,	Sept. 14, 1915	Sept. 27	Dec. 31
Becket, .	Berkshire,	Special,	Reuben Barker,	Oct. 6, 1914	April 12	Oct. 6
Becket, .	Berkshire,	Surfacing,	R. A. Vesper,	April 14, 1915	April 26	June 22
Becket, .	Berkshire,	Bridge,	R. A. Vesper,	Aug. 26, 1914	June 26	June 19
Bernardston,	Franklin,	1915,	C. B. Raymond,	April 21, 1915	May 3	July 14
Beverly,	Essex,	Surfacing,	E. R. Boucher,	April 28, 1915	May 4	June 3
Bourne,	Barnstable,	1915,	C. R. Mosher,	Feb. 14, 1915	Mar. 29	April 17
Bourne,	Barnstable,	1915,	R. W. Allen,	Feb. 14, 1915	April 17	May 29
Braintree,	Norfolk,	1915,	Harvey S. Jewell,	Sept. 14, 1915	Oct. 11	Dec. 22
Brockton,	Plymouth,	Surfacing,	Allan I. Dean,	May 4, 1915	June 24	Oct. 1
Cambridge,	Middlesex,	Special,	J. Albert Holmes,	Aug. 31, 1915	Sept. 23	Dec. 18
Franklin,	Franklin,	1915,	L. R. Sellew,	June 2, 1915	June 28	July 17
Charlemon,	Franklin,	1915,	C. B. Raymond,	June 2, 1915	July 17	Sept. 16
Charlemon,	Franklin,	1915,	C. B. Raymond,	Oct. 18, 1915	Nov. 13	Dec. 17
Charlton,	Worcester,	1915,	N. R. Clark,	Mar. 2, 1915	July 7	July 17
Chelmsford,	Middlesex,	1915,	J. E. Lawrence,	Aug. 3, 1915	Aug. 9	Dec. 16
Chelmsford,	Middlesex,	Surfacing,	Carrie O. Turner,	Aug. 3, 1915	Oct. 20	Dec. 16
Cheshire,	Berkshire,	1915,	Marie A. Lynch,	Aug. 31, 1915	Sept. 20	Dec. 7
			Malcolm B. Ross,	Nov. 9, 1915	Dec. 6	Dec. 25

HIGHWAY COMMISSION.

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TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE, ETC.—Concluded.

Town or City.	County.	Year.	Resident Engineer.	Date of Contract.	Date of Beginning, 1915.	Date of Ending, 1915.
Northborough,	Worcester,	Surfacing,	Goo. H. Delano,	Aug. 24, 1915	Sept. 13	Doc. 15
Northbridge,	Worcester,	1915,	Osborn Palmer,	April 20, 1915	May 4	July 31
Northbridge,	Worcester,	1915,	Samuel Hobbs,	April 20, 1915	July 31	Oct. 26
Oakham,	Chapter 221,	Atleo C. Langley,	July 6, 1915	July 7	Nov. 27	
Palmer,	Chapter 221,	Eugene M. Webster,	Sept. 7, 1915	Sept. 15	Nov. 27	
Palmer,	Chapter 221,	W. J. Hurley,	Sept. 7, 1915	Sept. 15	Nov. 29	
Palmer,	Chapter 221,	R. O. Stofford,	Sept. 7, 1915	Sept. 15	Dec. 27	
Hampton,	Chapter 221,	E. A. Armington,	July 6, 1915	July 13	July 24	
Hampton,	Chapter 221,	R. L. Armington,	July 6, 1915	July 24	Dec. 11	
Pembroke,	1915,	John E. Troy,	Sept. 9, 1914	Sept. 14	Mar. 31	
Pembroke,	1915,	R. H. Hostford,	Sept. 14, 1915	Sept. 15	Dec. 31	
Pembroke,	1915,	Allan L. Dean,	June 15, 1915	June 24	Juno 26	
Pembroke,	1915,	N. S. Tinney,	June 15, 1915	June 26	Aug. 7	
Pembroke,	1915,	A. H. Briggs,	June 15, 1915	June 26	Aug. 7	
Bristol,	1915,	H. C. Holden,	April 20, 1915	May 5	June 5	
Bristol,	1915,	R. W. Allen,	April 20, 1915	May 5	July 22	
Middlesex,	Surfacing,	B. J. Dakill,	April 28, 1915	June 1	Oct. 13	
Middlesex,	Surfacing,	E. J. Dakill,	Sept. 8, 1915	Sept. 20	Oct. 13	
Bristol,	Surfacing,	H. O. Parker,	April 27, 1915	May 25	Aug. 19	
Suffolk,	Surfacing,	Harry Sharpe,	May 4, 1915	May 28	June 10	
Worcestor,	Chapter 221,	John R. Wolff,	Aug. 11, 1915	Sept. 9	Doc. 11	
Worcestor,	Chapter 221,	Atleo Langley,	July 6, 1915	July 7	Nov. 27	
Easton,	1914,	L. P. Henderson,	April 14, 1914	Jan. 1	Feb. 20	
Reading,	1914,	J. E. Lawrence,	April 14, 1914	Mar. 8	April 10	
Rehoboth,	1914,	L. P. Henderson,	April 14, 1914	April 10	Juno 12	
Revere,	Surfacing,	Harry Sharp,	May 5, 1915	May 26	July 14	
Russell,	Surfacing,	R. W. Coburn,	May 5, 1915	July 14	Aug. 31	
Rutland,	1914,	Goo. H. Dolano,	May 6, 1914	Jan. 1	Jan. 16	
Salem,	1914,	A. P. Rice,	May 6, 1914	April 26	May 29	
Salem,	1914,	W. J. Hurley,	Oct. 3, 1914	April 7	July 8	
Salem,	1914,	W. J. Hurley,	Oct. 20, 1914	Mar. 22	July 9	
Easton,	1914,	R. A. Venner,	Nov. 4, 1915	Nov. 22	Dec. 13	
Easton,	1914,	A. L. Ford,	May 5, 1914	Mar. 31	Nov. 1	
Easton,	1914,	E. P. Staples,	May 4, 1915	May 17	Nov. 8	
Easton,	Surfacing,	Goo. H. Delano,	Aug. 24, 1915	Sept. 13	Dec. 15	
Saunderbury,	Surfacing,					
Saunderbury,	Surfacing,					
Sheffield,	Surfacing,					
Sheffield,	Surfacing,					
Shirley,	Surfacing,					
Shirley,	Surfacing,					
Shrewsbury,	Surfacing,					
Shrewsbury,	Surfacing,					

Somerset,	Bristol,	Wm. K. Widger,	Aug. 30
Somerset,	Bristol,	Wm. K. Widger,	Dec. 11
Somerville,	Middlesex,	J. E. Lawrence,	May 29
Somerville,	Middlesex,	Harry Sharpe,	Jan. 1
South Hadley,	Hampshire,	D. H. Townsend,	July 6
South Hadley,	Hampshire,	E. H. Townsend,	Sept. 10
Southbridge,	Worcester,	N. R. Clark,	Dec. 4
Southbridge,	Worcester,	A. P. Rice,	Nov. 13
Sterling,	Essex,	Allan I. Dean,	May 25
Stoughton,	Essex,	R. L. Armington,	April 27, 1915
Stoughton,	Essex,	Allan I. Dean,	Sept. 8
Stoughton,	Essex,	H. W. Brown,	May 4
Sutton,	Essex,	R. W. Coburn,	April 28, 1915
Sutton,	Essex,	R. W. Coburn,	June 2
Swampscott,	Essex,	Allan I. Dean,	July 17
Swansea,	Worcester,	Wm. K. Widger,	July 24
Swansea,	Worcester,	H. O. Parker,	Oct. 16
Taunton,	Worcester,	Wm. K. Widger,	Sept. 18
Taunton,	Worcester,	H. O. Parker,	Sept. 8
Taunton,	Worcester,	A. H. Briggs,	April 28, 1914
Taunton,	Worcester,	E. N. Briggs,	May 24
Taunton,	Worcester,	Samuel Hobbs,	May 24
Taunton,	Worcester,	H. W. Brown,	Nov. 20
Taunton,	Worcester,	Eugene M. Webster,	Aug. 20
Taunton,	Worcester,	W. J. Hurley,	Aug. 20
Taunton,	Worcester,	R. O. Spofford,	May 24
Taunton,	Worcester,	A. P. Rice,	July 21
Townsend,	Middlesex,	John E. Troy,	Aug. 23
Upton,	Middlesex,	Arthur W. Vose,	Dec. 31
Uxbridge,	Hampshire,	N. S. Thayer,	Sept. 8
Ware,	Hampshire,	E. A. Armington,	June 18
Ware,	Hampshire,	Allan I. Dean,	Sept. 15
West Boylston,	Worcester,	Allan I. Dean,	Nov. 29
West Springfield,	Middlesex,	John R. Wolff,	Dec. 27
Weymouth,	Hampshire,	Harry P. Burden,	June 2
Weymouth,	Berkshire,	A. R. Wardwell,	Oct. 2
Whitman,	Middlesex,	H. W. Ingham,	Dec. 31
Whitman,	Norfolk,	Martin J. Dalton,	June 2
Williamsburg,	Plymouth,	Martin J. Dalton,	June 1
Williamsburg,	Hampshire,	John I. Dean,	Dec. 31
Williamstown,	Berkshire,	John R. Wolff,	June 1
Williamstown,	Berkshire,	Harry P. Burden,	Aug. 28
Woburn,	Middlesex,	A. R. Wardwell,	Sept. 4
Wrentham,	Norfolk,	H. W. Ingham,	Dec. 1
Wrentham,	Norfolk,	Martin J. Dalton,	June 20
		May 19, 1915	June 1

APPENDIX E.

SHOWING CONTRACT PRICES ON

TOWN OR CITY.	Contractor.	EXCAVATION.			BITUMINOUS SURFACING.			
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).	Portland Cement Concrete (Cubic Yard).	Asphalt (Square Yard).	Asphalt (Gallon).	Tar (Square Yard).
Abington, Abington-Whitman and Brockton.	Town, Edward J. Rourke,	\$0 50 65	\$0 60 11 00	\$2 00 -	\$13 50 -	-	-	\$0 12 11 1/2
Amherst, . .	Lane Construction Cor- poration.	50	60	1 50	12 00	-	4065	-
Andover, . .	David J. Sheehan Company.	45	160	760	-	\$0 30	-	20 03
Ashburnham, . .	Alco Contracting Company.	55	52	1 75	11 50	-	406	-
Ashby, . .	Alco Contracting Company.	70	*1 00	-	-	-	05	-
Barre-Petersham, .	R. H. Newell Com- pany.	40	50	2 00	10 00	-	404	-
Bernardston, . .	E. Raymond Newell, .	55	55	2 00	12 00	-	-	-
Beverly, . .	John A. Gaffey,	-	-	-	-	-	-	203
Bourne, . .	Town,	50	50	2 00	12 00	-	406	10 1/2
Braintree, . .	Edward J. Rourke, .	50	60	2 00	12 00	-	05	-
Cambridge, . .	City,	50	80	2 00	13 00	12, 13 1/2	-	-
Charlemont, . .	Town, . .	50	1765	2 00	12 00	404	-	-
Charlemont, . .	Town,	50	1765	2 25	12 00	-	404	-
Charlton, . .	Timothy Toomey,	45	*1 00	1 50	11 00	17 00	20 100	06
Cheeshire, . .	Middlesex Construction Company.	45	-	1 50	-	-	-	-
Chester-Becket,	Fred E. Ellis,	60	21 60	2380	-	-	-	05
Chelmsford, . .	Thomas & Murphy,	55	60	2 25	10 00	23	-	-
Chelmsford, . .	James E. Watkins,	50	60	2 50	9 50	2480	-	-
Danvers, . .	D. Linehan & Son,	50	100	1 80	9 00	-	045	-
Dedham, . .	Town,	75	180	3 00	12 00	-	20	-
Deerfield, . .	Daniel O'Connell's Sons.	45	199	-	-	439	-	-
Deerfield, . .	A. G. & D. T. Perry,	40	58	01	9 00	-	404	-
Dighton and Taun- ton.	Hamilton Flood,	70	*50	-	*1 00	-	03	115
Duxbury, . .	Edward J. Rourke, .	50	55	1 00	11 00	2332	-	232
Edgartown-Oak Bluffs.	Frank C. Taylor, .	-	90	184 25	-	-	-	045
Gardner, . .	Richmond F. Hudson,	60	-	*1 50	21 00	-	06	-
Gloucester, . .	Perini Construction Company.	45	55	1 50	12 00	*28	*265	25
Grafton, . .	Torchia & Bruni,	45	65	1 50	8 00	-	-	04 1/4
Grafton-Upton, . .	Perini Construction Company.	40	50	1 50	12 00	181 50	06	*1 50
Granby-South Had- ley.	Lane Construction Cor- poration.	40	60	1 50	15 00	-	-	-
Great Barrington- Sheffield.	John DeMichael & Bros. }	40	60	2 00	{ *3 00 5 00 } 2455	-	-	-

¹ Gravel borrow.² Loosening, scarifying and reshaping.³ Broken stone excavated, screened and replaced.⁴ Asphaltic oil.⁵ Sixteen-inch.⁶ Twenty-inch.⁷ Excavation of broken stone in present macadam.⁸ Fourteen-inch.⁹ Sand for filling voids.¹⁰ Ten-inch.¹¹ Fencing rebuilt, lineal foot.¹² Warrenite.¹³ Including five-year surety bond for maintenance.¹⁴ Fifteen-inch vitrified clay.¹⁵ Ten-inch iron water pipe.¹⁶ Curbstone inlets.¹⁷ Including overhaul.¹⁸ Rock embankment.¹⁹ 1, 2, 4 Portland cement concrete masonry, per cubic yard.

APPENDIX E.

STATE HIGHWAYS DURING 1915.

BROKEN STONE.		PIPE CULVERTS (LINEAL FOOT).						Fencing (Lineal Foot).	Stone Filling for Under-drains (Cubic Yard).	Bounds (Each).	Catch-basins (Each).
Local (Ton).	Trap (Ton).	CLAY.			CORRUGATED IRON.						
		Twelve-inch.	Eighteen-inch.	Twenty-four-inch.	Twelve-inch.	Eighteen-inch.	Twenty-four-inch.				
\$1 75	-	-	-	-	-	-	-	\$0 30	\$1 10	\$2 00	\$30 00
21 85	3\$1 00	-	-	-	-	-	-	-	1 00	-	-
1 50	-	-	-	-	\$1 10	5\$1 30	6\$1 75	30	-	2 00	-
1 40	-	-	-	-	-	-	-	-	-	-	-
1 48	-	-	-	-	1 30	81 70	-	28	11 00	-	-
-	2 64	-	-	-	-	-	-	-	-	-	-
1 44	-	-	-	-	51 30	1 50	1 90	30	-	-	-
169	-	-	-	-	75	1 15	51 00	30	80	2 00	-
160	1 95	-	-	-	-	-	-	-	-	-	-
2 00	-	10\$0 75	-	-	-	-	-	30	1120	2 00	-
1 45	175	-	-	-	90	1 25	1080	30	1 00	2 00	30 00
1 90	-	75	\$1 50	14\$0 90	1065	151 75	1050	30	180	1810 00	50 00
181 00	11 10	-	-	-	75	51 00	-	30	-	2 00	-
181 00	185	-	-	61 75	1 20	81 35	51 50	30	-	2 00	-
1 55	91 00	-	70	1 40	-	-	1 75	2125	1 00	2 50	-
-	-	-	-	-	-	-	-	-	-	-	-
1 60	-	-	-	-	-	-	-	-	1 05	-	-
1 40	-	-	-	-	-	-	-	-	-	-	-
-	1 60	60	1 10	1045	1475	-	-	30	167 00	2 00	27 50
1 40	-	85	1 20	1065	-	-	-	28	95	2 00	27 00
2 00	-	75	1065	-	151 75	-	-	-	-	2 00	30 00
-	-	-	-	-	-	-	-	-	92	-	-
-	1 80	60	-	-	1 25	1 65	101 00	24	-	-	-
1 67	2 25	-	-	-	-	-	-	-	1 10	-	-
1 65	-	2750	1060	-	271 75	-	-	30	185	2 00	35 00
23	23	-	-	-	-	-	-	42	-	-	-
-	302 30	-	-	-	-	-	-	-	1 00	-	-
1 65	1 90	65	1050	-	-	-	-	30	1610 00	2 00	30 00
1 50	-	60	95	1040	1460	-	-	27	-	2 00	25 00
1 30	2 15	75	1 20	1490	332 00	1060	165	27	75	1610 00	30 00
170	1 30	-	-	-	1 00	1 50	2 00	30	80	2 00	-
-	-	1 50	-	-	-	2 00	352 50	22	202 00	-	-

²⁰ Bridge excavation, per cubic yard.²¹ Rustic guard rail.²² Gravel for filling voids.²³ Excavation of broken stone.²⁴ Concrete surfacing.²⁵ Gravel and oil mixture.²⁶ Sand and oil mixture.²⁷ Eight-inch.²⁸ Pile bridge in place.²⁹ Removing old bridge.³⁰ Including removal of old surfacing and all loosening and scarifying.³¹ Including gravel and broken stone.³² Cobblestone gutter, per square yard.³³ Twelve-inch iron water pipe.³⁴ Dry rubble masonry, per cubic yard.³⁵ Eighteen-inch iron water pipe.

SHOWING CONTRACT PRICES ON

TOWN OR CITY.	Contractor.	EXCAVATION.			BITUMINOUS SURFACING.			
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).	Portland Cement Concrete Masonry (Cubic Yard).	Asphalt (Square Yard).	Asphalt (Gallon).	Tar (Square Yard).
Greenfield, . . .	Richmond F. Hudson,	\$0 65	\$1 00	-	-	-	-	\$0 05
Greenfield, . . .	Richmond F. Hudson,	60	21 25	\$1 00	-	-	\$0 05	.08
Greenfield, . . .	Town,	65	-	11 00	-	-	-	.05
Hadley-Amherst, . .	Lane Construction Corporation.	60	70	71 50	\$1 50	-	-	.05
Holden, . . .	Town, . . .	50	80	2 00	13 50	-	-	.07
Holden, . . .	Town, . . .	50	70	2 00	13 50	-	-	.05
Lee, . . .	Town,	55	75	1 80	15 00	\$17 00	.05	\$12 00
Leominster, . . .	R. H. Newell Company.	60	970	2 00	14 00	45	-	-
Lincoln, . . .	Rowe Contracting Company.	60	975	-	-	-	.06	-
Marlborough, . . .	John A. Gaffey,	60	970	-	-	-	115	-
Methuen-Lawrence, .	Merrimac Construction Company.	45	50	.95	-	-	{ 412 .09 }	-
New Braintree, . .	Columbus Construction Company.	45	65	2 00	10 00	-	.04	-
New Marlborough-Sheffield.	Louis Longhi & Bros.,	-	-	-	-	-	-	-
Northampton, . . .	Philpot Contracting Company.	48	55	1 50	9 90	-	.04	-
North Andover, . . .	Bonfiglio Perini & Co.,	47	57	1 70	7 50	-	-	1385
Northborough-Shrewsbury.	Richmond F. Hudson,	60	60	-	-	-	.04	-
Northbridge, . . .	Jeremiah J. McCarthy Company.	50	65	2 00	9 00	1375	-	-
Oakham-Rutland, . .	Charles E. Horne,	50	60	2 00	14 00	-	.035	-
Palmer-Ware, . . .	Perini Construction Company.	42	50	1 50	12 00	-	.04	-
Pembroke, . . .	Town, . . .	50	55	2 00	10 00	-	13	-
Randolph, . . .	Town,	50	960	2 00	10 00	173 00	-	1385
Raynham, . . .	Snow & Farrington, .	60	65	1 50	14 00	-	-	12
Reading, . . .	Town,	-	9191 00	-	-	545	-	-
Reading, . . .	John A. Gaffey,	53	960	2059	-	35	-	-
Rehoboth, . . .	Herbert E. Cushing,	90	-	-	-	-	-	12½
Revere, . . .	Central Construction Company.	-	-	-	-	211 20	-	-
Russell, . . .	Lane Construction Corporation.	60	191 00	1 50	12 00	\$16 00	.04	-
Salem-Swampscott, .	Michael McDonough Company.	60	91 00	2075	252 00	.04	.04	.03
Sheffield, . . .	Town,	60	70	2 00	10 00	-	-	-
Shrewsbury, . . .	B. E. Savage,	-	91 50	288 50	-	602¾	045	.04
Somerset, . . .	Joseph McCormick,	65	780	-	-	-	04½	-
Somerset-Swansea, .	Hamilton Flood,	70	750	-	-	-	-	12
Somerville, . . .	Central Construction Company.	-	-	-	-	211 20	-	-
South Hadley, . . .	Lane Construction Corporation.	50	71 75	.350	-	-	17	-
Southbridge, . . .	Timothy Toomey,	45	60	281 15	71 50	.03	-	.05

¹ Sand for filling voids.² Gravel for surfacing.³ Gravel for filling voids.⁴ Oil coating.⁵ Asphaltic oil.⁶ Loosening, scarifying and reshaping.⁷ Broken stone excavated, screened and replaced.⁸ 1, 2, 4 Portland cement concrete masonry, per cubic yard.⁹ Gravel borrow.¹⁰ Bridge excavation, per cubic yard.¹¹ Ten-inch.¹² Twenty-four-inch iron water pipe.¹³ Concrete surfacing.

STATE HIGHWAYS DURING 1915 — *Continued.*

BROKEN STONE.		PIPE CULVERTS (LINEAL FOOT).						Fencing (Lineal Foot).	Stone Filling for Under-drains (Cubic Yard).	Bounds (Each).	Catch-basins (Each).	
		CLAY.			CORRUGATED IRON.							
Local (Ton).	Trap (Ton).	Twelve-inch.	Eighteen-inch.	Twenty-four-inch.	Twelve-inch.	Eighteen-inch.	Twenty-four-inch.					
-	\$2 00	-	-	-	-	-	-	-	-	-	-	
-	\$1 50	-	-	-	-	-	-	-	-	-	-	
-	2 00	-	-	-	\$1 50	-	-	-	-	\$2 00	\$30 00	
-	\$2 05	-	-	-	-	-	-	-	-	-	-	
\$1 60	\$1 25	\$0 80	-	\$2 50	-	-	-	\$0 30	\$1 00	2 00	-	
1 60	\$1 25	80	-	-	-	-	-	30	1 00	2 00	-	
\$1 15	2 25	75	\$1 15	-	1 15	\$1 50	\$3 00	30	1 30	2 00	192 50	
1 95	\$1 20	75	1170	-	-	-	-	30	\$22 00	2 00	37 00	
-	2 00	-	-	-	-	-	-	-	-	-	-	
1 70	-	-	-	-	-	-	-	-	-	-	-	
1 47	-	-	-	-	-	-	-	40	-	1 00	-	
1 40	-	-	1 50	-	1 30	2 00	-	25	75	-	-	
-	364	1 80	48	-	-	-	122 00	-	28	85	1 90	29 00
1 45	-	1160	1467	-	1 40	-	-	30	-	2 00	30 00	
1 45	-	-	-	-	-	-	-	-	-	-	-	
-	-	75	1175	-	111 50	-	-	30	-	2 00	30 00	
1 60	-	-	1 30	-	1 25	-	-	30	1 00	990	-	
1 50	-	-	-	151 40	1 10	1 75	2 00	1622	85	980	230	
1 65	-	65	-	-	1 30	111 00	151 45	30	1 00	2 00	30 00	
-	-	-	-	-	1 25	111 10	-	30	-	2 00	30 00	
-	1 90	80	1850	-	1 00	-	-	35	11 00	1 50	30 00	
1 65	-	-	-	-	-	-	-	-	-	2 00	-	
1 50	-	-	-	-	-	-	-	-	-	-	-	
1 60	-	-	-	-	-	-	-	-	1 25	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	
1 40	-	221 50	151 60	231 40	1 25	1 75	-	1615	1 00	91 25	241 00	
-	1 50	-	-	-	-	-	-	-	-	-	-	
21 30	-	-	-	-	1 00	1 50	-	30	1 00	2 00	-	
-	2 69	-	-	-	-	-	-	-	-	-	-	
1 95	-	-	-	-	-	-	-	-	1 15	-	-	
1 78	-	-	-	-	-	-	-	-	1 10	-	-	
-	1 70	-	-	-	-	-	-	-	2 15	-	-	
1 55	2 25	-	-	-	-	-	-	-	1 25	-	-	

¹⁴ Side drains.¹⁵ Sixteen-inch.¹⁶ Rustic guard rail.¹⁷ Dry rubble masonry, per cubic yard.¹⁸ Eight-inch.¹⁹ Including overhaul.²⁰ Excavation of broken stone in present macadam.²¹ Including five-year surety bond for maintenance.²² Rock embankment.²³ Fourteen-inch.²⁴ Cobblestone gutter, per square yard.²⁵ Sand for sand and tar mixture.²⁶ Gravel and sand borrow.

SHOWING CONTRACT PRICES ON

TOWN OR CITY.	Contractor.	EXCAVATION.			Portland Cement Concrete, Masonry (Cubic Yard).	BITUMINOUS SURFACING.		
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).		Asphalt (Square Yard).	Asphalt (Gallon).	Tar (Square Yard).
Stoughton,	Town,	\$0 55	\$0 60	\$2 00	\$15 00	-	-	-
Sutton-Uxbridge,	Timothy A. Moynihan,	45	50	180	-	-	-	\$0 30
Swansea,	Luke H. Callan,	50	60	1 50	9 00	-	-	-
West Boylston,	Town,	60	60	2 00	10 00	\$0 40	-	\$0 04
Westford,	James E. Watkins,	40	60	2 00	74 00	-	-	-
West Springfield,	Adams & Ruxton Construction Company.	60	\$1 50	\$1 30	-	101 00	-	1104
Weymouth,	Columbus Construction Company.	45	50	2 00	15 00	-	\$0 04	-
Williamstown,	S. W. Menaghale & Co.,	65	74	2 00	14 60	142 40	15	-
Woburn,	Davis & Pallatto,	45	158	1 35	9 00	1755	09	-

¹ Gravel borrow.² Eight-inch.³ Ten-inch.⁴ Fifteen-inch vitrified clay.⁵ Gravel for surfacing.⁶ Asphaltic oil.⁷ Dry rubble masonry, per cubic yard.⁸ Broken stone excavated, screened and replaced.⁹ Gravel for filling voids.¹⁰ Warrenite.

STATE HIGHWAYS DURING 1915 — *Concluded.*

BROKEN STONE.		PIPE CULVERTS (LINEAL FOOT).									Fencing (Lineal Foot).		Stone Filling for Under-drains (Cubic Yard).		Bounds (Each).		Catch-basins (Each).		
Local (Ton).	Trap (Ton).	CLAY.			CORRUGATED IRON.			Twelve-inch.	Eighteen-inch.	Twenty-four-inch.	Twelve-inch.	Eighteen-inch.	Twenty-four-inch.	Fence (Lineal Foot).	\$1 10	\$2 00	\$30 00	-	-
		Twelve-inch.	Eighteen-inch.	Twenty-four-inch.	Twelve-inch.	Eighteen-inch.	Twenty-four-inch.												
\$1 80	-	\$0 80	\$0 50	\$0 65	\$1 10	-	-	-	-	-	-	-	-	\$0 30	\$1 10	\$2 00	\$30 00	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$0 90	-	-	-	-
1 48	-	-	-	-	-	-	-	-	-	-	-	-	-	30	85	2 00	-	-	-
1 75	-	75	1 50	-	-	-	-	-	-	-	-	-	-	30	-	2 00	34 00	-	-
-	-	\$0 50	-	-	-	-	-	-	-	-	-	-	-	30	\$80	-	27 50	-	-
-	\$2 00	-	-	-	-	-	-	-	-	-	-	-	-	-	1 90	-	-	-	-
1 375	-	1245	-	-	1 10	12 \$1 00	13 \$1 50	25	80	2 00	28 00	-	-	-	-	-	-	-	-
1 58	16 25	-	-	-	1 50	1 75	-	30	87	185	1630	-	-	-	-	-	-	-	-
1 30	-	75	1 25	-	181 75	-	-	25	196 00	1 50	25 00	-	-	-	-	-	-	-	-

¹¹ Loosening, scarifying and reshaping.¹² Sand for filling voids.¹³ Fifteen-inch.¹⁴ Bridge excavation, per cubic yard.¹⁵ 1, 2, 4 Portland cement concrete masonry, per cubic yard.¹⁶ Iron pipe fence, lineal foot.¹⁷ Cobblestone gutter, per square yard.¹⁸ Twenty-four-inch iron water pipe.¹⁹ Curbstone inlets.

APPENDIX F.

STATEMENT OF CLAIMS AGAINST THE COMMISSION.

[As required by section 5, chapter 18 of the Revised Laws.]

NAME.	Residence.	Nature of Claim.
Budreau, William, . . .	Wilmington, . . .	Damage due to accident alleged to have occurred on State highway in Wilmington.
Flagg, Lucretia T., . . .	Northampton, . . .	Damages due to construction of State highway in Northampton.
Ireson, Jennie E., . . .	Wrentham, . . .	Damages due to construction of State highway in Wrentham.
Jordan, S. Annie, . . .	Wrentham, . . .	Damages due to construction of State highway in Wrentham.
Kneisel, Joseph S., . . .	Dedham, . . .	Damages due to construction of State highway in Dedham.
Laffey, Martin C. and Ralph T.	Weston, . . .	Damages due to accident alleged to have occurred on State highway in Weston.
Lake, Alexander G., . . .	Natick, . . .	Damages due to accident alleged to have occurred on State highway in Natick.
Lynch, Jennie M., . . .	Wareham, . . .	Damages due to construction of State highway in Wareham.
McDonough, Michael, . . .	Swampscott, . . .	Claim for extra compensation under contract for construction of Humphrey St., Swampscott.
McGee, John P., . . .	Marlborough, . . .	Damages due to construction of State highway in Marlborough,
Ray, Foster S., . . .	Charlton, . . .	Damages due to construction of State highway in Charlton.
Reed, William H., . . .	Gloucester, . . .	Damages due to accident alleged to have occurred on State highway in Gloucester.
Taft, Kate P., . . .	Northampton, . . .	Damages due to construction of State highway in Northampton.
York, Addie A., . . .	Wrentham, . . .	Damages due to construction of State highway in Wrentham.

APPENDIX G.

MAINTENANCE

Table showing the Amounts expended for Repair and Maintenance, the Cost per Mile for Maintenance during 1915, the Cost per Mile per Year on Each Road, the Number of Miles under Maintenance and the Amounts to be assessed upon Municipalities for Maintenance under Chapter 47 of the Revised Laws.

HIGHWAY COMMISSION.

[Pub. Doc.]

Table showing the Amounts expended for Repair, Maintenance, etc.—Continued.

TOWN OR CITY.	AMOUNT EXPENDED.				EXPENDED PER MILE IN 1915.				Length under Maintenance (Miles).	Cost per Mile per Year.	Amount to be assessed on Cities and Towns.
	To 1915.	During 1915.	Total.	To 1915.	During 1915.	Total.	From Revenue Appropriation.	From Motor Vehicles Fees Fund.			
Barre, .	\$12,056 60	\$803 38	\$12,859 98	\$532 09	\$729 07	\$1,261 16	\$14,121 14	\$277 99	\$252 27	\$329 24	\$578 00
Becket, .	12,662 86	2,359 98	15,022 84	12,010 24	4,443 61	16,453 85	31,476 69	500 41	766 17	604 74	444 00
Belchertown, .	2,158 01	2,485 61	4,643 62	2,377 60	2,258 27	4,251 51	3,736 62	188 54	156 52	313 33	8 88
Belchertown, .	2,073 90	648 82	2,622 72	234 97	620 88	805 85	3,428 57	160 91	161 26	311 17	165 00
Bellingham, .	1,938 65	849 16	2,787 81	3,599 69	327 96	3,927 65	6,715 46	267 00	103 13	370 16	318 00
Berkley, .	850 52	263 37	1,113 89	195 86	48 50	244 36	1,358 25	200 02	38 49	247 51	172 58
Bernardston, .	1,040 34	2,794 27	1,363 49	686 64	2,070 13	4,864 40	1,044 53	132 30	296 83	385 14	1,26 63
Beverly, .	42,452 76	2,022 99	44,475 75	61,004 97	13,116 26	74,121 23	118,696 98	356 16	2,309 20	2,665 36	1,593 83
Billerica, .	991 74	201 67	1,193 41	487 81	114 66	602 37	1,795 78	347 70	197 51	545 21	482 73
Blackstone, .	4,268 63	1,386 58	5,655 21	2,383 05	764 34	3,147 39	8,802 60	371 74	204 91	280 25	746 00
Bourne, .	5,163 01	2,228 23	7,392 26	1,304 62	1,672 44	3,037 52	10,429 58	1,591 89	1,194 60	576 65	3 73
Bourne, .	6,499 02	1,223 28	7,822 30	9,149 41	2,267 32	11,416 73	19,239 50	1,626 87	217 38	344 25	1,161 42
Boxborough, .	4,067 74	751 87	4,723 09	404 85	5,127 94	9,947 55	227 16	122 31	349 47	247 14	266 08
Braintree, .	2,478 75	194 41	2,673 16	1,362 27	3,300 51	5,973 67	183 42	128 56	311 97	412 83	106 50
Brewster, .	11,973 66	911 08	12,884 74	3,960 95	1,351 75	5,312 70	18,197 44	116 50	172 86	289 36	148 34
Bridgewater, .	4,690 52	748 66	5,439 14	1,888 66	6,034 64	7,923 20	13,362 34	215 75	1,739 06	1,954 81	7 82
Brinfield, .	4,028 03	1,517 02	5,545 05	6,831 90	2,502 22	9,334 12	14,879 17	382 12	630 28	1,012 40	245 94
Brockton, .	5,181 90	8,759 55	13,971 45	10,850 55	9,392 11	20,242 66	34,214 11	2,319 14	2,478 13	4,797 27	6,429 08
Brockfield, .	11,496 75	1,982 97	13,475 72	3,042 06	3,944 13	3,436 19	16,915 91	428 28	85 80	513 38	3 73
Buckland, .	10,174 24	1,322 24	11,436 48	10,657 74	1,326 64	11,984 28	23,480 76	308 21	309 22	320 26	4,63 00
Burlington, .	6,351 85	730 20	7,142 05	2,377 77	647 92	3,025 69	10,167 74	207 95	170 51	346 89	4,29 86
Canton, .	4,032 26	8,686 21	7,447 11	4,057 95	11,505 06	20,161 27	1,248 38	1,256 33	378 46	252 36	190 00
Charlenton, .	4,653 95	5,789 08	7,639 36	568 05	1,072 73	1,040 63	9,290 19	439 49	254 82	694 31	2,950 17
Charlton, .	7,450 59	1,463 09	8,913 68	1,964 05	1,263 03	3,232 08	13,146 76	229 97	184 40	348 37	210 75
Chatham, .	6,429 83	1,006 76	7,436 56	7,357 94	4,833 05	12,190 99	19,627 99	140 41	674 07	814 48	7,17 00
Chelmsford, .	6,903 59	1,587 80	8,701 39	8,111 34	1,088 72	9,200 06	17,981 45	303 89	175 31	479 30	321 22
Chester, .	4,022 90	825 23	4,848 13	10,463 66	2,486 65	12,950 41	17,788 54	859 61	2,590 46	3,450 07	1,550 40
Cheshire, .	10,263 16	2,370 42	12,633 58	833 39	784 71	1,618 10	14,251 68	350 65	116 08	466 01	297 03
Chichester, .	10,656 90	2,250 92	12,907 82	2,866 29	6,580 36	9,446 65	22,324 47	340 01	994 01	1,334 02	331 00
Chilmark, .	21,375 16	2,325 97	23,692 90	37,898 40	1,22 01	38,020 50	61,046 37	424 35	31 37	455 72	1,408 54
Clarksbury, .	3,357 04	490 97	3,838 01	265 89	222 91	488 80	4,336 81	47 43	54 00	303 31	206 85
Cohasset, .	5,206 90	618 66	5,825 56	4,333 25	3,642 15	5,945 40	13,770 96	271 34	1,597 43	1,868 77	2,28 50

Colrain,	3,116 73	197 72	3,392 33	4,313 48	921 15	106 50
Dalton,	13,078 82	1,486 80	3,306 99	3,793 46	486 47	2,13
Dartmouth,	14,566 82	3,318 33	215 79	3,533 60	18,360 28	140 50
Dedham,	8,844 91	10,199 60	7,647 03	36,646 58	13,732 70	339 64
Deerfield,	9,007 45	28,900 55	281,00	45,654 03	345 67	469 03
Dennis,	956 78	675 18	57,01	298 01	210 74	129 39
Dighton,	3,116 52	359 33	31,246 78	40,383 22	1,095 19	921 15
Douglas,	1,348 90	26,191 42	9,136 44	66,574 64	1,720 65	129 43
Dover,	11,144 30	1,718 95	6,515 79	1,032 64	1,165 36	140 50
Dracut,	3,490 45	8,580 25	8,553 82	17,143 59	21,287 92	107 17
Dudley,	653 78	4,144 23	8,580 82	8,553 87	17,143 59	1,402 27
Duxbury,	2,468 70	3,217 84	6,680 49	10,259 13	169 24	106 50
Duxbury,	2,645 20	4,200 92	742 06	4,041 29	4,987 11	469 03
Duxbury,	1,555 75	2,636 42	19 30	786 16	737 05	339 64
Duxbury,	1,821 79	814 63	19 30	717 75	3,373 47	129 39
Duxbury,	5,178 95	892 18	6,071 13	6,840 43	183 24	723 37
Duxbury,	8,962 95	9,766 17	2,145 43	1,840 77	3,023 67	921 15
East Longmeadow, .	684 04	803 22	2,488 85	1,79 13	3,984 20	1,386 00
Eastham,	4,966 74	710 17	5,676 91	4,965 01	2,711 12	12,913 04
Easthampton,	5,557 43	6,105 21	6,73 60	8,020 88	12,913 04	129 39
Easton,	1,022 40	111 32	1,133 22	1,33 35	6,872 46	469 03
Edgartown,	4,833 89	997 60	5,831 49	1,109 52	1,227 52	1,386 00
Egremont,	-	-	-	1,109 52	7,059 01	1,386 00
Erving,	7,191 53	1,306 69	8,498 22	2,718 37	677 11	-
Essex,	3,752 29	8,498 89	8,838 29	1,026 16	160 92	-
Fairhaven,	1,928 55	84 38	2,012 93	12,986 90	2,271 86	107 17
Fall River,	6 00	6 00	6 00	15,268 18	17,281 11	1,402 27
Falmouth,	17,262 29	6,489 13	23,751 42	21,404 92	9,580 62	600 00
Fitchburg,	13,047 98	9,901 01	13,948 98	17,999 64	1,069 15	30,985 54
Florida,	-	4,258 30	4,258 30	2,037 21	2,037 21	19,068 79
Foxborough,	3,293 71	1,117 70	4,411 41	4,236 75	2,444 64	2,444 64
Framingham,	4,482 59	881 17	5,363 76	4,236 75	2,45 04	4,471 79
Freetown,	2,810 93	1,881 57	3,892 50	1,923 53	2,683 87	2,683 87
Gardner,	3,271 45	715 64	3,987 09	4,446 62	439 41	2,179 18
Gay Head,	7,737 25	347 46	8,084 71	20,499 89	7,866 21	8,873 12
Gill,	-	148 66	148 66	148 66	29 75	10,495 08
Gloucester,	-	23 50	23 50	23 50	29 75	10,495 08
Goshen,	25,308 97	2,278 87	27,387 84	10,117 07	549 13	10,666 20
Grafton,	7,756 38	43 98	7,800 36	12,555 54	832 30	13,407 84
Granby,	7,676 75	1,750 03	9,426 78	6,049 85	608 58	6,748 43
Great Barrington, . .	7,843 01	1,659 70	9,302 71	1,033 79	1,033 78	1,337 57
Greenfield,	14,491 65	343 23	14,834 88	23,286 81	2,443 83	25,670 64
Gretton,	4,372 57	1,126 83	5,499 40	5,913 58	14,037 00	19,950 58
Groveland,	2,098 61	504 28	2,512 89	750 37	1,733 03	4,245 92
Hadley,	3,064 55	1,701 67	3,766 22	2,921 50	135 51	6,823 23
Hamilton,	15,160 59	1,152 58	16,300 67	20,639 25	15,697 87	36,337 12
Hanover,	6,487 55	1,038 64	7,526 19	2,607 76	403 22	3,010 98

HIGHWAY COMMISSION.

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Table showing the Amounts expended for Repair, Maintenance, etc.—Continued.

TOWN OR CITY.	AMOUNT EXPENDED.				MOTOR VEHICLES FEES FUND.				EXTENDED PER MILE IN 1915.				Length under Main- tenance (Miles).	Amount to be assessed on Cities and Towns.
	REVENUE APPROPRIATION.		To 1915.	During 1915.	From Motor Vehicles Fees Fund.		Total.	From Revenue Approp- riation.	Total.	From Motor Vehicles Fees Fund.	Total.	\$37,089.89		
	To 1915.	During 1915.	Total.	To 1915.	During 1915.	Total.	\$37,089.89	\$459.76	\$60.63	\$520.39	\$9.24	3.23		
Hancock,	\$26,689.44	\$1,485.02	\$28,174.46	\$8,719.58	\$195.85	\$8,915.43	\$33.337.23	\$273.21	\$122.25	\$395.46	\$27.05	1.85	\$161.50	
Hanover,	1,886.43	505.44	2,391.87	719.19	226.17	945.36	2,258.10	217.97	111.01	328.78	25.37	.82	370.00	
Hardwick,	1,975.00	178.57	2,157.57	9.9	91.03	100.53	1,924.98	109.41	302.39	13.52	2.31	142.50		
Harvard,	2,208.87	445.78	2,654.65	629.74	250.73	882.47	3,537.12	192.98	109.41	302.39	13.52	2.31	370.64	
Harwich,	8,610.06	1,250.94	9,861.00	2226.56	800.97	16,888.33	193.05	123.61	316.66	3.97	6.48	648.00		
Hatfield,	4,565.78	912.50	5,478.28	1,487.75	174.34	1,662.01	7,140.37	257.77	49.25	307.02	14.08	3.54	558.17	
Haverhill,	15,762.50	2,212.80	17,975.30	2,977.53	436.03	3,413.56	21,388.80	386.85	76.23	463.08	5.72	1.361	30	
Hingham,	7,176.39	420.58	7,596.97	10,565.22	3,606.18	14,071.40	21,668.37	158.11	1,318.11	1,476.22	28.89	2.06	2,259.96	
Hinsdale,	1,520.63	192.84	1,713.57	119.71	252.23	371.94	2,085.51	189.06	247.28	436.34	33.69	1.02	51.00	
Holbrook,	2,165.17	555.46	2,720.63	3,832.57	234.37	4,066.94	6,787.57	317.41	133.92	451.33	15.23	1.75	175.00	
Holden,	14,514.79	1,874.91	16,389.70	9,364.85	392.08	26,736.63	299.51	62.63	362.14	4.62	6.26	626.00		
Holliston,	3,287.61	843.01	4,110.62	1,965.96	374.46	2,328.42	6,439.04	171.00	75.96	246.96	9.74	4.93	640.41	
Holyoke,	5,097.31	542.72	5,640.03	3,549.14	668.10	32,217.24	37,857.04	130.46	160.60	201.06	12.97	4.16	661.93	
Hudson,	1,436.00	352.01	1,788.10	502.48	24.46	2,315.04	308.78	21.46	330.24	32.89	1.14	190.31		
Huntington,	10,303.48	780.06	11,089.64	3,884.43	474.99	4,339.42	15,448.98	347.81	210.17	557.98	18.14	2.26	1,246.00	
Ipswich,	3,450.32	507.96	5,458.28	5,359.69	1,445.50	4,805.19	10,353.47	474.66	327.04	801.69	29.59	4.42	1,894.01	
Kingston,	1,632.47	278.63	1,931.10	1,106.40	172.57	2,728.97	2,733.17	169.19	442.36	26.19	1.02	102.00		
Lakeville,	4,575.09	784.88	5,359.97	3,706.71	1,270.34	4,977.05	10,337.02	93.80	151.95	245.84	3.70	8.36	836.00	
Lancaster,	2,251.93	386.26	2,638.42	1,073.01	260.43	1,334.19	2,972.38	309.01	208.34	317.35	1.25	345.38		
Lanesborough,	2,498.74	1,137.19	3,635.93	480.94	169.75	650.69	4,286.62	496.59	74.13	670.72	2.29	1.14	500.50	
Lawrence,	4,075.32	287.22	4,362.64	15,196.81	141.64	15,338.45	19,700.99	354.59	174.86	529.45	105.05	.81	226.41	
Leicester,	25,854.49	2,233.03	28,087.52	6,719.08	718.61	7,437.60	35,525.21	279.48	89.94	369.42	4.68	7.99	1,536.61	
Lenox,	33,570.00	2,125.82	35,704.82	27,915.36	1,459.53	29,374.89	65,079.97	436.51	299.70	736.21	8.51	4.87	6,074.00	
Lochaber,	43,622.47	2,663.68	46,286.15	33,724.49	1,305.66	34,030.15	81,724.49	347.74	170.45	518.19	6.34	7.06	2,095.12	
Loominster,	3,751.58	1,088.39	4,839.91	3,053.82	375.68	1,429.50	6,269.41	426.82	147.33	574.85	2.55	763.82		
Lexington,	16,314.77	1,362.48	17,677.25	12,889.55	763.29	13,452.84	31,130.09	317.50	177.93	495.52	6.58	4.29	1,127.45	
Lincoln,	9,140.71	731.71	9,871.94	4,662.36	10,928.65	15,951.01	25,462.95	354.97	5,305.17	5,660.14	145.50	4.42	412.00	
Littleton,	4,120.06	641.56	4,761.62	13,950.62	1,473.72	15,034.91	19,796.23	139.47	320.37	450.84	12.67	2.06	460.00	
Lowell,	19,435.02	20,331.36	23,496.75	625.50	3,122.25	24,453.58	33,334.26	323.24	754.28	13,58	2.65	813.83		
Lunenburg,	9,065.00	1,127.81	10,192.81	1,352.54	618.06	26,163.41	227.84	124.86	352.70	6.93	4.95	495.00		
Lynn,	9,278.80	1,684.78	10,963.58	6,307.30	132.31	6,489.01	17,463.19	584.94	45.94	630.93	172.01	2.88	919.74	
Mansfield,	1,210.65	357.89	1,568.54	643.78	74.72	718.50	2,287.04	295.78	61.75	357.53	165.01	1.21	222.63	
Marion,	12,694.46	13,555.90	14,273.38	14,281.13	14,273.38	28,401.51	41,957.41	130.32	2,159.36	809.92	6.01	2,289.63		

Table showing the Amounts expended for Repair, Maintenance, etc.—Continued.

TOWN OR CITY.	AMOUNT EXPENDED.				EXPENDED PER MILE IN 1915.				Cost per Mile per Year.	Length under Main- tance (Miles).	Amount to be assessed on Cities and Towns.			
	REVENUE APPROPRIATION.				From Revenue Approp- riation.									
	To 1915.	During 1915.	Total.	To 1915.	During 1915.	Total.	From Motor Vehicles Fees Fund.	Total.						
Pittsfield,	\$43,511.41	\$2,968.69	\$46,480.10	\$29,206.51	\$7,348.38	\$36,644.89	\$83,124.99	\$1,473.86	\$913.36	7.00	\$4,780.14			
Plainville,	2,790.88	4,429.00	7,219.88	17,072.34	1,136.94	18,209.28	21,429.16	186.52	563.89	2.30	230.00			
Plymouth,	10,570.35	1,083.95	11,663.90	7,806.40	7,278.30	15,084.70	26,747.94	68.25	546.00	2.57	2,574.35			
Provincetown,	2,695.61	204.27	2,899.88	2,831.96	249.97	3,081.93	5,981.81	91.60	112.09	2.23	223.00			
Quincy,	2,470.34	70.40	2,549.74	8,800.48	793.42	9,593.90	12,043.64	77.18	725.23	7.10	220.00			
Randolph,	6,518.06	777.46	7,295.52	12,737.12	869.18	13,606.30	20,901.82	291.18	616.53	2.67	896.85			
Raynham,	1,763.28	1,739.61	3,502.89	7,227.61	182.80	7,410.41	9,350.02	928.05	96.21	1,024.26	465.63			
Reading,	1,553.28	354.02	1,907.30	1,337.00	449.83	1,786.83	3,694.13	72.24	91.80	164.04	155.22			
Rehoboth,	11,148.26	13,969.49	25,117.75	18,166.76	8,737.61	26,904.37	52,022.12	3,524.04	2,223.31	5,747.35	1,091.76			
Riverside,	11,375.84	504.61	11,890.45	7,617.38	10,118.25	17,735.63	29,616.08	77.15	1,547.13	1,624.28	406.37			
Richmond,	9,472.97	1,666.41	11,139.35	10,511.53	17,600.80	28,112.33	39,251.71	986.04	10,414.67	1,664.00	3,380.00			
Rochester,	5,065.00	1,496.13	6,561.13	5,881.35	520.84	6,506.16	13,067.28	372.16	130.55	502.71	254.77			
Rockland,	5,032.35	933.89	6,026.24	4,801.71	293.96	5,095.67	11,121.91	161.08	47.64	208.72	61.17			
Rockport,	3,090.47	231.49	3,330.96	4,162.75	434.33	4,597.08	7,928.04	98.50	184.82	283.32	313.73			
Roxbury,	2,727.15	944.43	3,671.58	2,481.15	73.19	2,654.34	5,924.65	594.01	45.74	639.75	470.23			
Russell,	5,542.07	1,343.68	6,882.92	4,848.83	3,807.62	10,994.47	13,300.22	393.14	133.20	502.34	466.66			
Rutland,	28,263.16	2,713.92	30,977.08	22,324.21	453.87	22,778.08	53,755.19	407.49	68.15	475.64	448.65			
Salem,	1,505.32	12,086.39	15,322.36	3,562.37	216.66	3,770.03	5,544.97	224.67	186.78	411.45	116.56			
Salisbury,	3,735.97	12,569.88	6,007.80	8,176.29	658.36	8,834.65	20,906.69	3,602.54	119.78	3,782.32	2,027.00			
Sandwich,	8,059.84	463.80	8,523.64	7,183.00	141.75	7,324.75	15,848.39	199.22	83.54	282.76	425.04			
Saugus,	8,949.79	1,573.18	10,521.97	22,913.22	1,132.50	24,045.72	34,567.69	620.27	64.06	83.64	262.09			
Savoy,	—	1,904.90	1,904.90	—	1,224.79	1,224.79	3,129.69	1,058.28	1,082.27	1,271.86	7.24			
Seituate,	9,857.81	7,073.23	10,521.03	5,910.87	17,722.85	27,323.88	130.55	680.44	1,738.72	1,604.97	1,900.00			
Seekonk,	7,243.75	367.33	7,611.09	25,735.93	918.04	26,653.97	34,265.65	211.93	213.16	4,466.97	4,950.90			
Sharon,	3,888.66	168.13	556.69	324.34	40.37	364.71	921.40	262.54	63.08	325.62	603.00			
Shedburne,	90	1,230.65	2,205.60	8,039.91	6,152.66	8,022.96	1,733.91	168.73	62.33	257.26	107.67			
Shirley,	46.00	492.95	538.95	3,226.75	1,915.95	8,068.61	16,108.62	95.19	887.01	982.20	7.24			
Shrewsbury,	24,051.25	21,175.69	45,224.94	30,256.75	8,367.50	47,623.90	92,845.84	4,356.72	397.17	1,721.63	6,078.35			
Somerset,	12,447.28	2,019.45	14,466.71	30,696.72	26,267.39	56,904.11	71,430.82	2,645.26	2,898.62	1,665.68	9,932.00			
Somerville,	4,853.42	302.93	5,156.35	5,192.59	29,298.57	34,491.16	39,647.51	191.72	18,533.40	4,827.15	1,553.00			
Southampton,	75.53	86.45	831.98	—	—	—	43.00	43.00	60.56	182.32	35.50			

4.049	47	764	65	4.814	12	3,099	35	221	79	3,221	14	8,135	26	207	24	60	11	273	05	3.69	
2.633	41	21,893	67	2,071	59	17,480	92	4,176	92	14,183	39	7,770	75	5,040	40	2,378	47	1,420	52	1,925	26
10,369	94	1,509	74	11,879	68	4,442	72	143	05	14,615	77	16,495	45	3,439	50	2,477	45	960	52	7.06	
8,281	45	849	93	9,131	38	2,314	84	629	23	4,874	04	10,984	42	1,054	00	4,467	75	540	12	612	00
6,457	97	8,281	45	1,118	38	6,666	35	3,130	66	633	93	1,853	04	10,984	42	257	65	222	21	810	00
8,467	55	540	04	9,007	81	16,440	57	246	01	7,114	20	12,701	87	52	67	613	49	2,955	28	2,683	95
5,294	77	292	30	5,587	67	5,006	80	514	38	5,521	18	8,756	02	86	89	3,064	85	1,338	99	5.56	
3,029	77	2,044	76	3,234	84	26,862	29	1,018	79	9,690	89	36,553	18	400	08	197	96	358	27	2.36	
24,817	86	2,058	59	3,105	17	6,789	14	301	60	7,090	74	10,195	91	263	62	199	97	500	72	511	00
4,514	51	723	81	5,238	32	3,879	22	364	44	5,243	66	10,481	95	317	46	484	60	1,197	47	198	50
8,670	33	10,968	39	12,663	25	4,018	60	8,553	92	12,572	52	32,211	67	7,301	59	5,740	85	1,258	00	228	00
5,353	39	1,242	57	8,262	54	2,272	58	8,575	62	16,092	72	24,685	84	527	39	341	74	6,65	65	665	00
7,022	83	6,732	13	8,777	25	7,472	38	11,718	23	1,239	72	12,957	97	20,341	97	149	71	1,028	52	290	27
6,777	31	1,704	48	8,481	79	4,478	50	1,004	25	5,482	75	13,964	54	286	08	167	38	374	48	4,295	14
13,568	97	9,858	63	1,193	23	9,005	89	2,031	04	232	56	2,263	60	6,008	20	120	49	453	46	5,69	
7,812	66	7,049	19	9,211	62	7,970	81	20,437	82	12,973	80	4,013	45	9,077	72	19,983	63	631	17	165	34
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	263	26	42	78	300	19	535	19
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	600	75	2,555	45
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
5,605	47	1,180	22	20,043	35	228	12	1,002	69	3,212	04	108	66	442	08	178	83	682	26	2,677	00
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	108	66	442	08	178	83	682	26
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	620	91	239	80
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	108	66	442	08	178	83	682	26
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	620	91	239	80
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	108	66	442	08	178	83	682	26
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	620	91	239	80
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	108	66	442	08	178	83	682	26
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	620	91	239	80
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7,564	75	13,387	55	544	98	249	55	322	42	346	51
39,874	14	737	08	40,611	22	6,953	40	340	63	47,905	25	7,924	03	132	02	147	71	1,221	13	566	13
1,268	52	940	83	2,200	35	891	89	110	80	1,002	69	3,212	04	108	66	442	08	178	83	682	26
4,107	66	273	06	4,380	62	13,375	33	128	22	13,503	53	17,884	17	231	41	108	66	620	91	239	80
7,078	69	1,377	00	8,455	92	2,200	40	550	70	2,751	50	11,207	09	296	19	118	42	414	07	8,550	45
13,073	95	4,210	74	17,248	69	23,818	45	5,428	55	29,247	00	46,531	69	220	48	438	38	255	08	386	00
13,560	53	1,400	35	14,960	88	9,059	73	289	85	9,348	98	24,309	00	341	55	103	64	288	51	158	00
5,357	56	463	23	1,473	80	7,477	19	89	75	7											

Table showing the Amounts expended for Repair, Maintenance, etc. — Concluded.

APPENDIX H.

STATEMENT SHOWING THE NUMBER OF PETITIONS RECEIVED AND THE LENGTH PETITIONED FOR, THE LAYOUTS MADE AND THEIR LENGTH AND DISTRIBUTION IN THE VARIOUS COUNTIES OF THE COMMONWEALTH.

COUNTIES.	PETITIONS RECEIVED.				PETITIONS SITUATED IN —			LAYOUTS MADE IN —			Number of Layouts.
	County.	City.	Town.	Totals.	City.	Town.	Totals.	City.	Town.	Totals.	
Barnstable, . . .	4	—	53	57	—	15	15	—	15	15	124
Berkshire, . . .	18	12	56	86	2	29	31	2	21	23	126
Bristol, . . .	5	8	50	63	3	17	20	2	17	19	119
Dukes, . . .	3	—	6	9	—	6	6	—	6	6	27
Essex, . . .	8	24	60	92	7	25	32	7	21	28	152
Franklin, . . .	2	—	62	64	—	18	18	—	15	15	106
Hampden, . . .	4	6	35	45	3	17	20	2	11	13	87
Hampshire, . . .	2	7	53	62	1	17	18	1	12	13	90
Middlesex, . . .	15	27	108	150	9	43	52	7	34	41	197
Nantucket, . . .	—	—	1	1	—	1	1	—	1	1	14
Norfolk, . . .	3	7	72	82	1	26	27	1	23	24	107
Plymouth, . . .	—	8	68	76	1	25	26	1	19	20	138
Suffolk, . . .	—	4	6	10	4	—	4	3	—	3	9
Worcester, . . .	1	9	167	177	2	57	59	3	44	47	280
Totals, . . .	65	112	797	974	33	296	329	29	239	268	1,576

NUMBER OF PETITIONS RECEIVED, ETC. — Concluded.

COUNTIES.	LENGTHS PETITIONED FOR.		LENGTHS LAID OUT.					
	1894-1914.		1915.		TOTALS.			
	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.
Barnstable, . . .	764,344	144.76	577,475	109.37	43,603	8.26	621,078	117.63
Berkshire, . . .	924,211	175.04	484,177	91.71	39,390	7.46	523,567	99.17
Bristol, . . .	880,391	166.74	421,555	79.84	16,819	3.18	438,374	83.02
Dukes, . . .	155,363	29.43	121,449	23.00	—	—	121,449	23.00
Essex, . . .	1,199,207	227.12	465,536	88.16	22,800	4.32	488,336	92.48
Franklin, . . .	724,567	137.23	324,382	61.43	31,671	6.00	356,053	67.43
Hampden, . . .	748,524	141.84	303,861	57.55	—	—	303,861	57.55
Hampshire, . . .	551,369	104.43	238,944	45.25	31,539	5.97	270,483	51.22
Middlesex, . . .	1,816,220	343.96	739,199	140.00	12,392	2.35	751,591	142.35
Nantucket, . . .	34,185	6.47	34,211	6.48	—	—	34,211	6.48
Norfolk, . . .	996,982	188.81	338,595	64.13	48,209	9.13	386,804	73.26
Plymouth, . . .	1,129,414	213.90	566,401	107.28	34,121	6.46	600,522	113.74
Suffolk, . . .	75,095	14.23	32,048	6.07	—	—	32,048	6.07
Worcester, . . .	2,013,359	381.30	838,456	158.80	48,141	9.12	886,597	167.92
Totals, . . .	12,013,231	2,275.26	5,486,289	1,039.07	328,685	62.25	5,814,974	1,101.32

APPENDIX I.

TABLE SHOWING THE WORK DONE UNDER THE "SMALL TOWN" ACT SINCE ITS PASSAGE IN 1900.

[Section 17, Chapter 47, Revised Laws, and Chapter 279, Acts of 1908.]

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1915.	In 1915.	Total Nov. 30, 1915.	Previous to 1915.	In 1915.	Total Nov. 30, 1915.	
<i>Barnstable County.</i>							
Eastham,	\$4,260 40	\$650 00 ¹	\$4,910 40	14,578	2,050	16,628	Grading; sand and oil.
Harwich,	1,300 00	-	1,300 00	7,705	-	7,705	Sand and oil.
Mashpee,	1,200 00	-	1,200 00	1,944	-	1,944	Macadam.
Provincetown,	5,095 56	-	5,095 56	9,930	-	9,930	Macadam.
Wellfleet,	1,653 00	-	1,653 00	2,250	-	2,250	Broken stone and clay.
<i>Berkshire County.</i>							
Alford,	\$13,508 96	\$650 00	\$14,158 96	36,407	2,050	38,457	Gravel.
Becket,	\$3,969 00	\$600 00 ²	\$4,569 00	10,357	1,402	11,759	Gravel.
Clarendon,	7,830 00	3,350 00 ³	11,200 00	6,080	1,600	8,280	Macadam.
Cheshire,	750 00	-	750 00	-	-	2,500	-
Clarksburg,	-	1,380 00 ⁵	1,380 00	-	2,400	2,400	Gravel.
Egremont,	7,232 30	1,000 00 ⁶	8,232 30	18,517	-	18,517	Gravel.
Florida,	7,336 00	9,436 00	16,772	46,426	10,020	56,446	Gravel and grading.
Hancock,	3,098 39	800 00 ⁹	3,898 39	7,228	1,360	8,588	Gravel.
Hinsdale,	4,000 00	4,000 00 ¹⁰	8,000 00	5,175	2,207	7,382	Bituminous macadam and gravel.
Lanesborough,	4,652 00	2,150 00 ¹¹	6,802 00	5,500	-	5,500	Gravel road and steel concrete bridge.
Monterey,	5,568 00	800 00 ¹²	6,368 00	16,000	1,601	18,201	Gravel.
Mount Washington,	3,392 00	750 00 ¹³	4,142 00	3,980	2,400 ⁴	6,380	Gravel and bridge repairs.
New Ashford,	2,561 00	-	2,561 00	2,600	-	2,600	Gravel road and culvert construction and repairs.
New Marlborough,	11,368 48	1,500 00 ⁶	12,868 48	34,560	4,285	38,845	Gravel.
Otis,	6,285 92	750 00	7,035 92	13,550	1,150	14,700	Gravel.
Peru,	6,691 00	-	6,691 00	9,345	-	9,345	Gravel.
Richmond,	6,150 00	1,800 00 ¹⁴	7,950 00	10,789	-	13,956	Bituminous gravel and macadam.
Sandsfield,	10,778 14	1,000 00 [*]	11,778 14	22,991	1,970	24,961	Macadam.
Savoy,	9,205 00	600 00	9,805 00	12,596	-	13,546	Gravel.

Sheffield,	-	-	-	8,488 00	\$8,488 00	16,182	16,182
Tyningham,	-	-	-	7,565 00	1,400 00 ¹⁶	2,250 -	14,450
Washington,	-	-	-	7,298 00	8,965 00	10,990	14,420
West Stockbridge,	-	-	-	8,026 00	8,648 00	3,080 -	17,307
Windsor,	-	-	-	2,500 00	9,626 00	847 -	1,110
					2,500 00		
					1,110		
<i>Bristol County.</i>							
Berkley,	-	-	-	\$25,630 00	\$161,589 23	284,186	43,189
Dighton,	-	-	-	\$1,500 00 ¹⁶	\$3,000 00	6,670	6,330
Easton,	-	-	-	1,500 00 ¹⁰	1,500 00	10,990	10,990
Freetown,	-	-	-	-	12,000 00	-	31,686
Mansfield,	-	-	-	-	31,686	-	-
Norton,	-	-	-	-	-		
Raynham,	-	-	-	-	-		
Rochoboth,	-	-	-	-	-		
Westport,	-	-	-	-	-		
<i>Essex County.</i>							
Boxford,	-	-	-	\$2,261 00	\$2,261 00	19,694	19,694
Danvers,	-	-	-	7,000 00	7,000 00	19,700	19,700
Essex,	-	-	-	1,932 00	1,932 00	34,500	34,500
Georgetown,	-	-	-	2,950 00	2,950 00	15,437	15,437
Groveland,	-	-	-	1,000 00	1,000 00	12,740	12,740
Lynnfield,	-	-	-	2,500 00	2,500 00	15,650	15,650
Marblehead,	-	-	-	7,800 00	7,800 00	11,008	11,008
Methuen,	-	-	-	-	500 00 ¹⁷	500 00	-
Middleton, ¹	-	-	-	-	3,944 00	11,900	7,500
North Andover,	-	-	-	500 00 ¹⁶	3,000 00	11,450	13,950
Rockport,	-	-	-	1,000 00	1,000 00	5,600	5,600
Salisbury,	-	-	-	1,948 00	1,948 00	2,150	2,150
Saugus,	-	-	-	-	1,200 00	900	900
Swampscott,	-	-	-	-	2,925 00	5,200	5,200
Topfield,	-	-	-	-	4,984 00	35,375	35,375
West Newbury,	-	-	-	1,000 00	1,200 00 ¹⁶	1,400	1,893
					2,200 00		
<i>Gloucester County.</i>							
Biddeford,	-	-	-	\$2,200 00	\$47,144 00	202,704	11,893

ted.

13 Town contributed \$350.

⁸ Town contributed \$1,000.

14 Town contributed \$1,300.
15 Town contributed \$900.

19 Town contributed \$3,000.

5 Town.com

5 Town contributed \$925.

1 Town contributed \$5,000.
1.1 Town contributed \$1,500.
1.2 Town contributed \$400.

17 Town contributed \$650.

2 Town contributed \$400.

WORK DONE UNDER THE "SMALL TOWN" ACT—Continued.

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	
<i>Franklin County.</i>							
Ashfield,	\$2,500.00	\$1,500.00 ¹	\$4,000.00	8,600	2,000	10,600	Gravel.
Bernardston,	2,965.00	—	2,965.00	16,400	—	16,400	Gravel.
Buckland,	2,500.00	—	2,500.00	6,600	—	6,600	Gravel and concrete bridge.
Charlemont,	5,600.00	1,300.00 ²	6,900.00	7,034	4,220	11,254	Gravel and grading.
Colrain,	4,575.00	1,300.00 ³	5,875.00	12,600	3,650	16,250	Gravel.
Conway,	8,352.00	1,500.00 ⁴	9,852.00	16,910	1,850	18,760	Gravel.
Gill,	3,912.00	—	3,912.00	14,275	—	14,275	Gravel road and bridge repairs.
Hawley,	4,197.00	700.00 ⁵	4,897.00	13,125	2,000	15,125	Grading and gravel.
Heath,	5,077.00	550.00 ⁵	5,627.00	12,272	— ⁶	12,272	Gravel.
Leverett,	8,176.00	900.00 ⁷	9,076.00	23,629	1,600	25,229	Gravel.
Leyden,	600.00	600.00	5,093.00	15,000	1,950	16,950	Gravel.
Monroe,	5,767.04	1,400.00 ⁹	7,167.04	11,070	2,600	13,670	Gravel.
New Salem,	9,352.00	1,650.00 ¹	11,002.00	20,622	— ⁶	20,622	Gravel.
Orange,	2,440.67	500.00 ¹⁰	2,940.67	11,225	2,000	13,225	Gravel.
Rowe,	6,323.00	900.00 ¹¹	7,223.00	16,066	1,200	17,266	Gravel and concrete bridge.
Shutesbury,	3,934.00	—	3,934.00	10,950	—	10,950	Gravel.
Warwick,	5,470.00	750.00	6,220.00	7,000	700	7,700	Gravel.
Wendell,	9,658.00	1,700.00 ¹²	11,358.00	15,800	4,400	20,200	Grading and gravel.
Whately,	2,600.00	2,600.00 ⁴	5,200.00	3,750	2,300	6,050	Macadam.
	\$97,871.71	\$17,850.00	\$115,721.71	242,928	30,470	273,398	
<i>Hampden County.</i>							
Blandford,	\$16,235.16	—	\$16,235.16	9,010	—	9,010	Grading and gravel.
Brimfield,	3,600.00	\$2,000.00 ¹³	5,600.00	7,220	3,050	10,270	Gravel.
Chester,	2,871.43	1,000.00 ¹⁴	3,871.43	6,762	1,689	8,451	Gravel.
East Longmeadow,	7,863.75	—	7,863.75	19,510	—	19,510	Gravel and macadam.
Granville,	10,523.00	1,100.00	11,623.00	19,105	5,945 ¹⁴	25,050	Grading and gravel.
Hampden,	6,158.00	550.00 ⁵	6,708.00	42,148	1,200	43,348	Gravel.
Holland,	1,214.00	400.00	1,614.00	3,555	497	4,052	Grading and gravel.
Longmeadow,	1,200.00	—	1,200.00	1,425	—	1,425	Macadam and concrete culvert.
Ludlow,	2,500.00	151.00 ¹⁵	2,651.00	— ¹⁶	— ¹⁶	— ¹⁶	—
Monson,	3,300.00	—	3,300.00	4,601	—	4,601	Macadam.
Montgomery,	2,220.00	400.00	2,620.00	5,450	720	6,170	Gravel.

Russell,	2,693	35	2,693	85	2,086	2,086
Southwick,	7,628	00	1,000	00 ¹	22,761	27,758
Tolland,	6,342	06	850	00 ¹	4,971 ⁴	9,112
Wilbraham,	—	—	2,900	00 ³	— ⁶	— ⁶
	\$74,349	25	\$10,351	00	\$84,700	25
					152,745	18,098
						170,843
<i>Hampshire County.</i>						
Amherst,	\$6,800	00	\$6,800	00	6,505	6,505
Belchertown,	—	—	\$1,000	00 ³	—	1,200
Chesterfield,	7,909	52	1,100	00 ^{1,7}	1,200	12,301
Cummington,	4,233	00	—	9,009	52	9,900
Easthampton,	2,000	00	—	4,233	00	—
Enfield,	8,170	56	1,000	00 ^{1,8}	2,430	2,430
Goshen,	1,400	00	—	2,000	00	36,410
Greenwich,	4,951	00	1,050	00 ⁴	3,110	Gravel.
Hadley,	5,500	00	6,000	00 ⁵	1,400	Gravel.
Hathfield,	2,500	00	—	6,001	00	6,050
Huntington,	4,050	00	1,000	00 ⁶	6,800	Macadam.
Middlefield,	3,360	00	—	5,000	00	3,525
Pelham,	6,770	00	1,150	00 ^{1,8}	4,340	Macadam.
Plainfield,	5,080	00	500	00 ^{1,8}	8,311	Gravel.
Prescott,	5,828	50	850	00 ^{2,0}	1,714	10,025
Southampton,	4,523	83	1,000	00 ^{1,8}	450	Gravel.
Westhampton,	6,586	35	832	00 ⁷	3,810	Gravel.
Williamsburg,	3,500	00	450	00 ⁸	4,558	Gravel.
Worthington,	9,677	00	1,000	00 ^{1,8}	11,550	Gravel.
	\$82,839	76	\$19,882	00	\$112,721	76
					185,203	34,704
						219,907
<i>Middlesex County.</i>						
Ashby,	\$1,000	00	—	\$1,000	00	8 Town contributed \$225.
Ayer,	4,000	00	—	4,000	00	9 Town contributed \$1,150.
Bedford,	4,500	00	—	4,500	00	10 Town contributed \$870.
Belmont,	2,300	00	—	2,300	00	11 Town contributed \$350.
Billerica,	8,484	00	—	8,484	00	12 Town contributed \$925.
Boxborough,	1,500	00	\$600	00 ^{1,7}	10,500	13 Town contributed \$500.
					6,700	14 Built with 1914 allotment.
					1,500	15 Town contributed \$385.
						16 Work done in 1914.
						17 Town contributed \$200.
						18 Work not yet begun.
						19 Town contributed \$150.
						20 Town contributed \$450.

¹ Town contributed \$1,000.² Town contributed \$400.³ Town contributed a like amount.⁴ Town contributed \$650.⁵ Town contributed \$100.⁶ Work begun, but not completed.⁷ Town contributed \$300.

WORK DONE UNDER THE "SMALL TOWN" ACT — *Continued.*

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	
<i>Middlesex County — Con.</i>							
Burlington,	\$8,100 00	—	\$8,100 00	16,009	—	16,009	Macadam.
Carlisle,	4,536 00	\$600 00	5,136 00	16,937	1,500	—	Gravel.
Duncut,	9,889 13	3,000 00 ¹	12,889 13	7,981	2,438	10,419	Macadam and bituminous macadam.
Dunstable,	3,799 00	400 00	4,199 00	23,500	1,950	25,450	Gravel.
Framingham,	4,000 00	—	4,000 00	4,200	—	4,200	Macadam.
Hopkinton,	2,000 00	—	2,000 00	3,400	—	3,400	Gravel.
Hudson,	7,000 00	—	7,000 00	20,557	—	20,557	Grading and gravel.
Littleton,	2,012 00	—	2,012 00	4,492	—	4,492	Gravel.
Maynard,	9,383 89	—	9,383 89	15,233	—	15,233	Cradding, macadam and bridge repairs.
North Reading,	12,500 00	2,000 00 ¹	14,500 00	24,675	4,500	29,178	Macadam.
Pepperell,	1,000 00	—	1,000 00	4,050	—	4,050	Gravel.
Reading,	6,632 00	—	6,632 00	7,120	—	7,120	Macadam and bituminous macadam.
Sherborn,	6,558 00	—	6,558 00	33,900	—	33,900	Gravel.
Shirley,	7,584 00	—	7,584 00	29,850	—	29,850	Gravel and bituminous macadam.
Stow,	5,145 00	1,000 00 ²	6,145 00	34,692	2,935	37,627	Gravel and macadam.
Townsend,	1,393 05	900 00 ³	2,293 05	5,550	2,792	8,342	Gravel.
Wakefield,	5,150 00	—	5,150 00	6,986	—	6,986	Macadam.
Wayland,	1,449 50	—	1,449 50	1,175	—	1,175	Bituminous macadam.
Westford,	2,366 30	—	2,366 30	5,400	—	5,400	Gravel.
Wilmington,	1,000 00	—	1,000 00	1,200	—	1,200	Bituminous macadam.
	\$123,381 87	\$8,500 00	\$131,881 87	311,197	20,615	331,812	
<i>Norfolk County.</i>							
Avon,	\$3,369 00	—	\$3,369 00	8,745	—	8,745	
Bellinham,	3,412 00	\$1,000 00 ²	4,412 00	9,865	4,500	14,365	Macadam and gravel.
Forbrough,	974 92	500 00 ¹	1,474 92	7,904	— ⁴	7,904	
Holbrook,	400 00	400 00 ¹	800 00	1,200	1,630	2,830	Gravel.
Medfield,	1,040 00	—	1,040 00	—	—	—	Macadam.
Medway,	5,328 00	—	5,328 00	13,106	—	13,106	Macadam and gravel.
Millis,	5,136 00	—	5,136 00	14,150	—	14,150	Gravel.
Needham,	1,500 00	2,500 00 ¹	2,500 00	3,850	—	3,850	Bituminous macadam.
Norfolk,	2,000 00	2,250 00 ¹	4,250 00	8,870	4,528	8,870	Gravel.
Sharon,	—	—	—	—	—	—	Macadam.
	\$23,159 92	\$6,650 00	\$29,809 92	68,980	14,508	83,488	

Town contributed a like amount.

Town contributed \$2,000.

3 Town contributed \$1,000.

Work begun, but not completed.

Work not yet begun.

Town contributed \$5,000.

Town contributed \$200.

Town contributed \$400.

Own contributed \$1,400

WORK DONE UNDER THE "SMALL TOWN" ACT — *Concluded.*

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	
Worcester County — Con.							
Phillipston,	\$3,050 00	\$643 12 ¹	\$3,050 00	33,390	— ²	33,390	Gravel.
Princeton,	5,500 00	0,143 12	6,628	6,828	— ²	6,828	Macadam.
Royalston,	3,000 00	4,500 00	10,500	4,000	14,500	14,500	Gravel.
Rutland,	5,954 00	5,954 00	9,908	9,081	9,081	9,081	Gravel and macadam.
Shrewsbury,	3,800 00	3,800 00	8,400	—	8,400	8,400	Gravel.
Southbridge,	9,125 00	—	9,125 00	5,993	—	5,993	Vitrified paving brick (paved) and bituminous macadam.
Spencer,	—	3,500 00 ¹	3,500 00	— ⁴	— ⁴	— ⁴	—
Starbridge,	3,950 00	—	3,950 00	5,683	—	5,683	Gravel.
Westborough,	3,500 00	2,000 00 ¹	5,500 00	7,837	7,800	7,800	Gravel and macadam.
Templeton,	2,000 00 ¹	2,000 00 ¹	4,000 00	—	3,340	3,340	Bituminous macadam.
West Brookfield,	4,950 00	—	4,950 00	2,080	2,336 ⁵	2,336 ⁵	4,416
Westminster,	5,500 00	—	9,000 00	2,050	—	2,050	2,050
Winchendon,	9,000 00	—	9,000 00	26,010	—	26,010	Gravel.
	\$150,092 00	\$21,743 12	\$171,835 12	375,890	61,932	437,822	

¹ Town contributed a like amount.² Work done in 1914.³ Town contributed \$800.⁴ Work begun, but not completed.⁵ Built with 1914 allotment.

SUMMARY.

COUNTIES.	ALLOTMENTS.			LENGTHS BUILT (FEET).		
	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.	Previous to 1915.	In 1915.	Total to Nov. 30, 1915.
Barnstable,	\$13,598 96	\$650 00	\$14,158 96	36,407	2,050	38,457
Berkshire,	135,959 23	25,630 00	161,589 23	284,186	43,189	327,375
Bristol,	36,742 00	6,750 00	43,492 00	106,835	21,020	127,855
Essex,	44,944 00	2,200 00	47,144 00	202,704	11,883	214,597
Franklin,	97,871 71	17,850 00	115,721 71	242,928	30,470	273,398
Hampden,	74,349 25	10,351 00	84,700 25	152,745	18,098	170,843
Hampshire,	92,839 76	19,882 00	112,721 76	185,203	34,704	219,907
Middlesex,	123,351 87	8,500 00	131,881 87	311,197	20,615	331,812
Norfolk,	23,159 92	6,660 00	29,809 92	68,980	14,508	83,488
Plymouth,	95,992 18	7,900 00	103,892 18	308,254	10,326	318,580
Worcester,	150,092 00	21,743 12	171,835 12	375,890	61,932	437,822
	\$888,840 88	\$128,106 12	\$1,016,947 00	2,275,329	268,805	2,544,134

APPENDIX J.

APPROPRIATIONS.

Appropriations for the Construction and Repair of State Highways.

1894, chapter 497, section 8,	. . . . .	\$300,000 00
1895, chapter 347, section 3,	. . . . .	400,000 00
1896, chapter 481, section 3,	. . . . .	600,000 00
1897, chapter 340, section 1,	. . . . .	800,000 00
1898, chapter 539, section 1,	. . . . .	400,000 00
1899, chapter 396, section 1,	. . . . .	500,000 00
1900, chapter 442, section 1,	. . . . .	500,000 00
1901, chapter 269, section 1,	. . . . .	500,000 00
1902, chapter 246, section 1,	. . . . .	500,000 00
1903, chapter 280, section 1,	. . . . .	2,250,000 00 ¹
1907, chapter 446, section 1,	. . . . .	2,500,000 00 ¹
1912, chapter 704, section 1,	. . . . .	5,000,000 00 ¹
		<hr/>
		\$14,250,000 00

Appropriations for the Salaries and Expenses of the Commission, paid from the Treasury of the Commonwealth.

1898, chapter 497, section 1,	. . . . .	\$14,300 00
1899, chapter 367, section 1,	. . . . .	28,500 00
1900, chapter 141, section 1,	. . . . .	28,500 00
1901, chapter 451, section 1,	. . . . .	33,750 00
1902, chapter 67, section 1,	. . . . .	33,750 00
1903, chapters 14 and 485, section 1,	. . . . .	43,950 00 ²
1904, chapters 19 and 461, section 1,	. . . . .	39,300 00 ²
1905, chapters 36, 431 and 480, section 1,	. . . . .	46,150 00 ²
1906, chapters 36 and 140, section 1,	. . . . .	49,514 14 ²
1907, chapter 157, section 1,	. . . . .	66,950 00 ³
1908, chapter 212, section 1,	. . . . .	76,300 00 ³
1909, chapter 127,	. . . . .	47,300 00 ⁴
1910, chapter 139,	. . . . .	56,250 00 ⁴
1911, chapter 555, section 1,	. . . . .	61,250 00 ⁴
1912, chapter 287, section 1,	. . . . .	61,500 00 ⁴
1913, chapter 35, section 1,	. . . . .	98,500 00 ⁵
1914, chapter 236, section 1,	. . . . .	105,500 00 ⁵
1915, chapter 183, section 1,	. . . . .	104,500 00 ⁵

¹ To cover expenses of construction for a period of five years.² Includes expenses of automobile department.³ Includes expenses of moth suppression and automobile department in part.⁴ Includes expense of moth suppression.⁵ Includes expense of moth suppression and maintenance of Fall River and Newburyport bridges.

Appropriations for Maintenance, paid from the Treasury of the Commonwealth.

1903, chapter 280, section 2,	. . . . .	\$40,000 00
1904, chapter 316, section 1,	. . . . .	50,000 00
1905, chapter 36, section 1,	. . . . .	60,000 00
1906, chapter 36, section 1,	. . . . .	64,166 66
1907, chapter 157, section 1,	. . . . .	100,000 00
1908, chapters 212 and 657, section 1,	. . . . .	150,000 00
1909, chapters 127 and 493, section 1,	. . . . .	250,000 00
1910, chapter 139, section 1,	. . . . .	200,000 00
1911, chapter 555, section 1,	. . . . .	200,000 00
1912, chapter 287, section 1,	. . . . .	200,000 00
1913, chapter 35, section 1,	. . . . .	200,000 00
1914, chapter 236, section 1,	. . . . .	350,000 00 ¹
1915, chapter 183, section 1,	. . . . .	350,000 00 ¹

¹ Includes appropriation for widening.

APPENDIX K.

DAILY AVERAGES FROM TRAFFIC RECORDS TAKEN FOURTEEN HOURS
Division 1.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
100	Williamstown,	26	14	4	16	36	255	6
101	Clarksburg,	55	73	7	34	28	156	18
102	Cheshire,	17	3	—	3	48	335	6
103	Williamstown,	30	40	3	21	70	410	15
104A	Pittsfield (east),	10	21	—	7	53	336	8
104B	Pittsfield (east),	41	52	5	61	52	265	57
105A	Great Barrington,	34	22	4	16	22	283	16
105B	Great Barrington,	63	35	10	29	29	326	25
106	Sheffield,	12	1	1	5	28	171	—
107A	Pittsfield (west),	13	25	1	5	19	99	5
107B	Pittsfield (west),	16	20	1	10	54	417	23
108	Lenox (north),	27	16	7	16	120	860	55
109A	Lenox,	49	28	20	17	89	401	42
109B	Lenox,	65	43	36	10	62	487	29
110A	Stockbridge,	62	18	6	56	37	217	12
110B	Stockbridge,	34	11	6	19	47	420	14
111	Sheffield,	14	3	4	33	30	171	5
112A	Egremont,	12	—	1	9	1	49	10
112B	Egremont,	27	3	6	8	11	197	11
113	Chester,	24	18	2	7	42	287	6
114	West Springfield,	10	33	1	13	140	569	53
115A	South Hadley,	63	140	4	63	52	193	51
115B	South Hadley,	70	189	1	55	25	112	29
116	Chicopee,	25	157	1	138	176	485	95
117	Agawam,	16	36	1	23	134	457	42
	<i>Amounts carried forward,</i>	815	1,001	132	674	1,405	7,958	633

APPENDIX K.

EACH DAY FOR ONE WEEK, BEGINNING AUG. 23, 1915, AT 7 A.M.

Division 1.

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.		HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.	All Kinds.		Light.	Heavy.	All.	Automobiles.			
30	30	60	297	357	8	9	17	83		Near Vermont line, road to Pownal.	
62	107	169	202	371	17	29	46	54		Briggsville store, near North Adams.	
17	6	23	389	412	4	2	6	94		Near Adams.	
33	61	94	495	589	6	10	16	84		Near North Adams line.	
10	28	38	397	435	2	7	9	91		Cheshire and Dalton roads, Cheshire traffic.	
46	113	159	374	533	9	21	30	70		Cheshire and Dalton roads, Dalton traffic.	
38	38	76	321	397	9	10	19	81		Junction State highway and Stockbridge roads, Stockbridge traffic.	
73	64	137	380	517	14	12	26	74		Junction State highway and Stockbridge roads, New Marlborough traffic.	
13	6	19	199	218	6	3	9	91		Under Mountain, near Bartholomew's.	
14	30	44	123	167	8	18	26	74		Hancock and Richmond roads, Richmond traffic.	
17	30	47	494	541	3	6	9	91		Hancock and Richmond roads, Hancock traffic.	
34	32	66	1,035	1,101	3	3	6	94		Pittsfield Road, foot Mattoon Hill.	
69	45	114	532	646	11	7	18	82		Stockbridge and Lee roads, Lee traffic.	
101	53	154	578	732	14	7	21	79		Stockbridge and Lee roads, Stockbridge traffic.	
68	74	142	266	408	17	18	35	65		Lenox and Lee roads, Lee traffic.	
40	30	70	481	551	7	6	13	87		Lenox and Lee roads, Lenox traffic.	
18	36	54	206	260	7	14	21	79		Canaan road, near Blodgett's.	
13	9	22	60	82	16	11	27	73		Junction Hillsdale and Under Mountain roads, New York traffic.	
33	11	44	219	263	13	4	17	83		Junction Hillsdale and Under Mountain roads, Connecticut traffic.	
26	25	51	335	386	7	6	13	87		East of village.	
11	46	57	762	819	1	6	7	93		Near Westfield.	
67	203	270	296	566	12	36	48	52		South Hadley and Centre and Granby roads, Centre Road traffic.	
71	244	315	166	481	15	50	65	35		South Hadley and Centre and Granby roads, Granby traffic.	
26	295	321	756	1,077	3	27	30	70		Rockrimmon Road, near Springfield.	
17	59	76	633	709	3	8	11	89		South of Whitman's Corner.	
947	1,675	2,622	8,996	12,618							

DAILY AVERAGES FROM TRAFFIC

Division 1 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts,	Touring Cars,	Wagons,
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	815	1,001	132	674	1,405	7,958	633
118	Longmeadow,	79	18	2	20	212	744	76
119	Becket,	5	2	1	3	62	282	4
120	Northampton,	32	22	7	29	93	282	49
121	Chicopee,	28	104	1	25	61	178	79
122A	Wilbraham,	47	52	1	15	140	617	33
122B	Wilbraham,	42	36	1	11	25	85	13
123A	Brookfield,	26	14	1	5	31	505	19
123B	Brookfield,	23	12	—	2	16	100	9
124A	Palmer,	15	12	—	11	90	458	12
124B	Palmer,	13	11	—	11	13	87	4
125	Auburn,	53	47	—	39	57	212	23
126	Paxton,	36	10	—	25	22	153	16
127A	West Brookfield,	27	15	—	5	83	476	24
127B	West Brookfield,	14	7	—	3	9	64	7
128	Brimfield,	13	8	1	5	13	78	3
129	Sturbridge,	63	24	2	33	59	182	22
130	Southbridge,	42	15	1	10	47	152	14
131A	Auburn,	19	43	—	18	42	248	13
131B	Auburn,	18	29	—	15	20	96	14
132	Leicester,	28	91	—	41	111	569	55
133	Holden,	23	28	1	13	59	235	7
	Totals,	1,461	1,601	151	1,013	2,725	13,771	1,144

Division 2.

201	Florida,	11	4	3	3	33	232	1
202	Greenfield (north),	60	13	1	6	90	367	29
203	Hatfield,	15	25	1	6	53	298	14
204	Sunderland,	99	49	2	36	53	211	23
205A	Bernardston,	75	11	2	5	43	234	14
	<i>Amounts carried forward,</i>	260	102	9	56	272	1,342	86

RECORDS, ETC. — *Continued.**Division 1 — Concluded.*

TOTALS.						PERCENTAGES.						Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.		HORSE-DRAWN.			Automobiles.				
Light.	Heavy.	All.				Light.	Heavy.	All.					
947	1,675	2,622	9,996	12,618		7	3	10	90			In village.	
81	38	119	1,032	1,151		2	1	3	97			Top Jacob's Ladder.	
6	5	11	348	359		7	10	17	83			Near Easthampton line.	
39	51	90	424	514		6	27	33	67			South of Willimansett village.	
29	129	158	318	476		5	8	13	87			Boston and Wilbraham roads.	
48	67	115	795	910		20	22	42	58			Boston and Wilbraham roads.	
43	47	90	123	213		4	3	7	93			Junction Boston and North Brookfield roads.	
27	19	46	605	651		14	9	23	77			Junction Boston and North Brookfield roads.	
23	14	37	125	162		2	4	6	94			Junction Boston and Brimfield roads.	
15	23	38	570	608		9	15	24	76			Junction Boston and Brimfield roads.	
13	22	35	109	144		12	20	32	68			Near Worcester.	
53	86	139	297	436		14	13	27	73			South of village.	
36	35	71	191	262		4	3	7	93			Boston and Ware roads.	
27	20	47	583	630		13	10	23	77			Boston and Ware roads.	
14	10	24	80	104		11	11	22	78			Near top Foskets Hill.	
14	13	27	94	121		17	15	32	68			East end, village.	
65	57	122	263	385		15	9	24	76			Near Charlton.	
43	25	68	213	281		5	16	21	79			Oxford line.	
19	61	80	308	388		9	23	32	68			Junction Oxford and Charlton roads.	
18	44	62	130	192		3	15	18	82			Near Worcester.	
28	132	160	735	895		7	11	18	82			Worcester line.	
24	41	65	301	366									
1,612	2,614	4,226	17,640	21,866									

Division 2.

14	7	21	266	287	5	2	7	93	Whitcomb summit.
61	19	80	486	566	11	3	14	86	Bernardston Road.
16	31	47	365	412	4	7	11	89	South of Chestnut Street.
101	85	186	292	478	21	18	39	61	East of Deerfield bridge.
77	16	93	291	384	20	4	24	76	Bernardston Hotel, Northfield traffic.
269	158	427	1,700	2,127					

DAILY AVERAGES FROM TRAFFIC

Division 2—Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts,	Touring Cars, Wagons,	Trucks, Omnibus,
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	260	102	9	56	272	1,342	86
205B	Bernardston,	23	2	1	2	23	161	3
206	Deerfield,	105	106	1	69	153	533	60
207	Hadley,	115	148	2	29	86	443	59
208	Westminster,	32	19	3	9	66	299	11
209	Ashburnham,	26	7	1	6	31	144	13
210A	Ashby,	12	3	—	4	26	127	3
210B	Ashby,	44	19	—	10	40	178	19
211A	Templeton,	63	42	1	18	82	319	7
211B	Templeton,	83	48	2	22	72	263	8
212	Lunenburg,	72	41	8	17	69	305	18
213	Montague (east),	49	50	3	10	57	321	22
214	Orange (east),	73	28	9	54	80	410	52
215	Barre,	57	43	5	16	8	200	11
	Totals,	1,014	655	45	322	1,065	5,045	372

Division 3.

300	Blackstone,	54	76	25	21	60	737	29
301	Franklin (west),	22	27	—	9	25	112	10
302	Uxbridge,	24	28	2	15	50	321	30
303	Sutton,	58	21	1	3	6	64	22
304	Grafton,	47	62	1	20	58	313	44
305	Holliston (south),	28	29	1	11	37	170	21
306	Natick,	13	28	—	17	124	558	44
307A	Wayland,	86	29	1	17	113	294	27
307B	Wayland,	72	50	2	71	278	1,071	88
308	Marlborough,	21	15	—	8	100	486	32
309	Southborough,	17	6	—	5	27	119	9
310	Shrewsbury,	55	57	1	36	152	694	46
311	West Boylston (south),	45	52	—	25	85	380	21
	<i>Amounts carried forward,</i>	542	480	34	258	1,115	5,324	423

RECORDS, ETC. — *Continued.**Division 2 — Concluded.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.	All.				
269	158	427	1,700	2,127	11	2	13	87		Bernardston Hotel, north traffic.	
24	4	28	187	215	10	17	27	73		South of Cheapside bridge.	
106	175	281	746	1,027	13	20	33	67		Opposite Elmwood House.	
117	177	294	588	882	8	6	14	86		Fitchburg traffic.	
35	28	63	376	439	12	6	18	82		Fitchburg-Winchendon Road.	
27	13	40	188	228	7	4	11	89		Townsend traffic, at bridge.	
12	7	19	156	175	14	10	24	76		Fitchburg traffic, bridge.	
44	29	73	237	310	12	11	23	77		Baldwinsville-Gardner traffic.	
64	60	124	408	532	17	14	31	69		Baldwinsville-Templeton west traffic.	
85	70	155	343	498	15	11	26	74		Opposite road to school.	
80	58	138	392	530	10	12	22	78		West of watering trough.	
52	60	112	400	512	11	12	23	77		Athol line.	
82	82	164	542	706	17	19	36	64		Barre Common.	
1,059	980	2,039	6,482	8,521							

Division 3.

79	97	176	826	1,002	8	10	18	82	Rhode Island line.
22	36	58	147	205	11	17	28	72	Taunton Road, near Unionville.
26	43	69	401	470	6	9	15	85	Near Blackstone line, Providence-Worcester.
59	24	83	92	175	34	13	47	53	Near Manchaug.
48	82	130	420	550	9	15	24	76	Providence-Worcester Road junction to North Grafton.
29	40	69	228	297	10	13	23	77	Near Milford line.
13	45	58	726	784	1	6	7	93	Near Wellesley line.
87	46	133	434	567	15	8	23	77	Natick Road, just south of crossroads.
74	121	195	1,437	1,632	5	7	12	88	Worcester Road, just east of crossroads.
21	23	44	618	662	3	4	7	93	Northborough line.
17	11	28	155	183	9	6	15	85	Near Westborough line.
56	93	149	892	1,041	5	9	14	86	West of center.
45	77	122	486	608	7	13	20	80	Near north end of State highway.
576	738	1,314	6,862	8,176					

DAILY AVERAGES FROM TRAFFIC

Division 3 — Continued.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons,	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	542	480	34	258	1,115	5,324	423
312A	Sterling,	29	14	2	3	34	134	10
312B	Sterling,	13	5	1	6	53	220	19
313	Ayer,	84	30	1	7	64	278	12
314A	Concord,	16	17	—	17	31	164	12
314B	Concord,	27	13	1	8	66	422	16
315	Lexington (west),	54	60	21	79	97	481	60
316	Chelmsford,	59	43	2	15	59	151	30
317	Chelmsford,	44	45	1	52	114	429	36
318	Lowell (north),	11	3	—	25	94	441	17
319	Tyngsborough,	20	17	1	6	105	599	25
320	Tewksbury,	38	32	2	15	94	502	41
321	Andover (south),	5	8	—	5	71	340	37
322	Andover (north),	67	107	4	28	96	392	70
323	Methuen (east),	22	35	—	12	75	378	31
324	West Newbury,	57	42	—	10	57	356	27
325	Amesbury (west),	15	15	—	4	91	421	33
326A	Salisbury,	40	53	—	16	75	499	18
326B	Salisbury Square,	25	30	1	6	51	325	37
326C	Salisbury (east),	40	47	—	13	127	776	63
327	Rowley,	49	46	2	12	107	525	18
328	Hamilton,	31	12	1	11	100	492	38
329	Essex,	52	54	1	23	66	345	60
330	Gloucester (south),	30	27	3	15	178	896	143
331	Beverly (east),	153	68	20	35	253	1,394	208
332A	Beverly (north),	30	24	2	24	22	78	4
332B	Beverly (north),	46	87	4	93	132	599	71
332C	Beverly (north),	29	24	3	4	41	202	7
333A	Topsfield,	4	1	—	1	53	282	6
333B	Topsfield,	5	4	—	—	60	283	3
	<i>Amounts carried forward,</i>	1,637	1,443	107	803	3,581	17,728	1,575

RECORDS, ETC.—Continued.

Division 3—Continued.

TOTALS.				PERCENTAGES.				Remarks.	
HORSE-DRAWN.			Automobiles.	HORSE-DRAWN.			Automobiles.		
Light.	Heavy.	All.		Light.	Heavy.	All.			
576	738	1,314	6,862	8,176				Clinton Road, north of Lancaster Road.	
31	17	48	178	226	13	8	21	Sterling Road, south of Leominster Road.	
14	11	25	292	317	4	4	8	Junction of Shirley and Groton roads.	
85	37	122	354	476	18	8	26	Harvard Road.	
16	34	50	207	257	6	13	19	North of railroad crossing at Reformatory, Fitchburg Road.	
28	21	49	504	553	5	4	9	Concord Road, Waltham Street.	
75	139	214	638	852	9	16	25	West of Chelmsford Center.	
61	58	119	240	359	17	16	33	North of Lowell line.	
45	97	142	579	721	6	14	20	Near Tyngsborough line.	
11	28	39	552	591	2	5	7	North of center.	
21	23	44	729	773	3	3	6	New Hampshire Road, north of square.	
40	47	87	637	724	6	6	12	Amesbury road.	
5	13	18	448	466	1	3	4	Near Beachmont Avenue.	
71	135	206	558	764	9	18	27	Near post office.	
22	47	69	484	553	4	8	12	Near Haverhill line.	
57	52	109	440	549	10	10	20	Near Prides' station.	
15	19	34	545	579	3	3	6	Dodge Street at crossing.	
40	69	109	592	701	6	10	16	Pike, south of Ipswich Street.	
26	36	62	413	475	5	8	13	Pike, north of Ipswich Street.	
40	60	100	966	1,066	4	5	9	Clinton Road, south of crossing.	
51	58	109	650	759	7	7	14	Clinton Road, north of crossing.	
32	23	55	630	685	5	3	8	Gloucester Road at center.	
53	77	130	471	601	9	13	22	Dodge Street at crossing.	
33	42	75	1,217	1,292	3	3	6	Dodge Street, south of crossing.	
173	103	276	1,855	2,131	8	5	13	Harvard Road.	
32	48	80	104	184	17	26	43	North of center.	
50	180	230	802	1,032	5	17	22	North of center.	
32	28	60	250	310	10	9	19	North of center.	
4	2	6	341	347	1	1	2	North of center.	
5	4	9	346	355	2	1	3	North of center.	
1,744	2,246	3,990	22,884	26,874					

DAILY AVERAGES FROM TRAFFIC

Division 3 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	1,637	1,443	107	803	3,581	17,728	1,575
334	Middleton,	59	42	1	7	42	209	10
335	Salem (east),	22	76	3	54	216	1,036	209
336A	Lynnfield,	11	16	—	3	72	401	8
336B	Lynnfield,	26	23	3	8	57	276	27
337	Stoneham (north),	17	26	—	13	117	624	52
338	Woburn,	25	25	4	19	137	232	36
339	Lynn (east),	12	31	—	25	533	2,472	96
340	Saugus (east),	17	172	1	42	46	216	151
341	Chelsea,	50	213	12	87	44	143	93
342A	Somerville,	40	107	18	72	52	203	102
342B	Somerville,	71	170	30	110	76	213	131
343	Boston,	40	118	11	61	82	629	120
344	Winchester,	11	21	1	20	143	607	90
345	Weston,	100	54	2	43	187	958	57
346	Hopkinton,	55	35	7	26	68	75	17
347	Millbury (north),	127	218	32	198	334	428	127
348	Dedham (west),	20	48	—	13	51	264	29
349	Dover,	34	33	1	18	51	183	18
350	Newton,	15	57	2	28	83	293	47
351	Groton,	99	35	24	21	192	257	19
352	Ipswich,	1	—	—	1	53	275	2
353	Newbury,	128	115	2	17	94	562	30
354	Newburyport,	64	91	1	15	148	927	85
355	Dracut,	10	21	1	1	66	357	38
356	Watertown,	26	120	8	64	187	485	339
357	Revere,	4	64	—	12	56	187	79
358	Salem (west),	19	26	1	16	91	421	139
359	Gloucester (north),	33	72	1	50	75	405	75
360	Lexington (east),	31	38	1	23	88	322	43
361	Salisbury,	24	24	2	3	355	708	25
	Totals,	2,828	3,534	276	1,873	7,377	32,096	3,869

RECORDS, ETC. — *Continued.**Division 3 — Concluded.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.	All.				
1,744	2,246	3,990	22,884	26,874	16	13	29	71			
60	49	109	261	370	2	8	10	90	West of center, taking concrete road as well.		
25	130	155	1,461	1,616	2	4	6	94	Loring Avenue, near pump station.		
11	19	30	481	.511	7	7	14	86	Pike, south of Wakefield Road.		
29	31	60	360	420	2	5	7	93	Pike, Wakefield Road east of Pike.		
17	39	56	793	849	6	9	15	85	Reading line.		
29	44	73	405	478	—	2	2	98	Lowell Road, near Wilmington.		
12	56	68	3,101	3,169	3	33	36	64	Saugus River bridge.		
18	214	232	413	645	9	47	56	44	Foxhill bridge, Revere-Saugus Road.		
62	300	362	280	642	10	30	40	60	East Boston end.		
58	179	237	357	594	13	35	48	52	Middlesex Avenue.		
101	280	381	420	801	5	17	22	78	South of junction, parkway.		
51	179	230	831	1,061	1	5	6	94	Grove Street.		
12	41	53	840	893	7	7	14	86	Arlington line.		
102	97	199	1,202	1,401	22	21	43	57	Worcester Road at center.		
62	61	123	160	283	11	28	39	61	Near Milford line.		
159	416	575	889	1,464	5	14	19	81	House of Joanna Sullivan, North Main Street, Worcester line.		
20	61	81	344	425	10	15	25	75	Near Boston line.		
35	51	86	252	338	3	16	19	81	Needham line.		
17	85	102	423	525	19	9	28	72	Near Needham line,		
123	56	179	468	647	—	—	—	100	Pepperell line.		
1	1	2	330	332	14	14	28	72	Pike at Lime Brook Road.		
130	132	262	686	948	5	8	13	87	Newburyport line.		
65	106	171	1,160	1,331	2	5	7	93	Bridge.		
11	22	33	461	494	3	15	18	82	River Road at Methuen line.		
34	184	218	1,011	1,229	1	19	20	80	Near Waltham.		
4	76	80	322	402	5	17	22	78	Traffic Road.		
20	42	62	651	713	6	11	17	83	Rockport line.		
34	122	156	555	711	2	3	5	95	Bedford line.		
32	61	93	453	546	2	3	5	95	New Hampshire line, Beach Road.		
26	27	53	1,088	1,141							
3,104	5,407	8,511	43,342	51,853							

DAILY AVERAGES FROM TRAFFIC

Division 4.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons,	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
401A	Wrentham,	28	32	1	9	4	94	6
401B	Wrentham,	30	20	1	5	45	357	40
401C	Wrentham,	23	25	1	7	7	109	10
402	Westwood,	21	40	1	14	107	795	49
403	Quincy,	25	180	2	62	316	1,682	146
404	Cohasset,	37	25	5	28	118	679	80
405A	Weymouth,	16	22	—	12	63	260	31
405B	Weymouth,	22	31	1	8	16	118	17
406A	Hanover,	28	11	1	8	40	220	23
406C	Hanover,	42	22	—	8	32	165	19
406D	Hanover,	141	57	2	23	58	453	51
407	Duxbury,	45	19	—	9	60	449	34
408A	Whitman,	28	70	—	30	53	211	60
408B	Whitman,	13	40	—	21	34	155	22
409A	Easton,	11	21	—	10	50	190	35
409B	Easton,	24	35	—	16	108	503	63
410	Taunton (north), . .	47	64	1	6	82	389	36
411	Dighton (south), . .	41	16	3	8	65	251	31
412	Taunton,	23	11	—	3	28	190	6
413A	Somerset,	147	230	4	27	128	755	80
413B	Somerset,	81	93	9	32	126	467	67
413C	Somerset,	69	77	1	18	83	459	13
413D1	Somerset,	92	141	7	32	109	473	66
413D2	Somerset,	11	20	1	5	8	31	3
414	Dartmouth,	105	127	1	55	115	700	130
415A	Freetown (east), . .	12	9	—	5	21	147	11
415B	Freetown,	13	2	—	—	10	58	5
416	Bridgewater,	32	31	1	15	85	404	40
417	Middleborough (south), . .	50	51	—	10	74	469	29
418A	Plymouth,	5	1	—	1	15	49	4
	<i>Amounts carried forward,</i>	1,262	1,523	43	457	2,090	11,312	1,207

RECORDS, ETC. — *Continued.**Division 4.*

TOTALS.					PERCENTAGES.					Remarks.
HORSE-DRAWN..			Automobiles.	All Kinds.	HORSE-DRAWN.		Automobiles.			Remarks.
Light.	Heavy.	All.			Light.	Heavy.	All.	Automobiles.		
29	41	70	104	174	17	23	40	60	Boston and Franklin roads.	
31	25	56	442	498	6	5	11	89	Boston and Providence.	
24	32	56	126	182	13	18	31	69	Franklin and Boston roads.	
22	54	76	951	1,027	2	5	7	93	Near park.	
27	242	269	2,144	2,413	1	10	11	89	Near Fore River bridge.	
42	53	95	877	972	4	6	10	90	Near Black Rock Depot.	
16	34	50	354	404	4	8	12	88	Washington and Main streets.	
23	39	62	151	213	11	18	29	71	Main Street and Washington.	
29	19	48	283	331	9	6	15	85	Junction, Rockland Road.	
42	30	72	216	288	15	10	25	75	Junction, Boston Road.	
143	80	223	622	845	17	9	26	74	Junction, Pembroke Road.	
45	28	73	543	616	7	5	12	88	Near Hound Brook.	
28	100	128	324	452	6	22	28	72	Temple and Bedford streets.	
13	61	74	211	285	5	21	26	74	Bedford and Temple streets.	
11	31	42	275	317	3	10	13	87	Brockton Road.	
24	51	75	674	749	3	7	10	90	Stoughton Road.	
48	70	118	507	625	8	11	19	81	Westville village.	
44	24	68	347	415	10	6	16	84	Near Taunton.	
23	14	37	224	261	9	5	14	86	Near Lakeville.	
151	257	408	963	1,371	11	19	30	70	Brightman Street bridge traffic.	
90	125	215	660	875	10	15	25	75	Brightman Street bridge, Taunton Road.	
70	95	165	555	720	10	13	23	77	Near Slade's Ferry bridge, Warren Road.	
99	173	272	648	920	11	19	30	70	Brightman Street bridge, Providence Road.	
12	25	37	42	79	15	32	47	53	Near Slade's Ferry bridge, Providence Road.	
106	182	288	945	1,233	8	15	23	77	South Mills village.	
12	14	26	179	205	6	6	12	88	Near Webb's Corner, Taunton Road.	
13	2	15	73	88	15	2	17	83	Near Webb's Corner, Middleborough Road.	
33	46	79	529	608	5	8	13	87	South Bridgewater village.	
50	61	111	572	683	7	9	16	84	North end of road.	
5	2	7	68	75	7	2	9	91	Sagamore and Bourndale roads.	
1,305	2,010	3,315	14,609	17,924						

DAILY AVERAGES FROM TRAFFIC

Division 4 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	1,262	1,523	43	457	2,090	11,312	1,207
418B	Plymouth,	8	1	—	2	23	226	8
419A	Marion,	43	60	—	47	121	617	62
419B	Marion,	16	8	—	1	11	49	6
420A	Bourne (north),	28	31	1	11	74	683	34
420B	Bourne (north),	37	42	1	14	105	1,072	47
421	Falmouth (west),	33	46	—	3	53	589	32
422	Sandwich,	23	7	—	1	50	443	9
423A	Barnstable (west),	17	8	—	1	23	179	14
423B	Barnstable (west),	17	5	—	1	25	188	10
424	Seekonk (north),	32	80	—	29	75	381	44
425A	Yarmouth,	56	36	—	1	68	476	4
425B	Yarmouth,	27	25	—	2	41	245	4
426	Harwich (south),	71	55	1	4	67	619	48
427A	Orleans (north),	63	76	1	15	78	468	21
427B	Orleans (north),	102	125	2	29	83	484	35
428	Wellfleet,	16	13	1	7	29	223	1
429	Seekonk (south),	27	86	1	26	105	492	70
430	Attleboro (west),	43	99	—	34	173	1,005	100
431	Brockton (south),	37	68	2	12	113	327	70
432	Barnstable (south),	93	119	2	18	214	1,204	84
433	Chilmark,	25	5	—	1	13	125	20
434	Mansfield (north),	32	22	—	8	44	182	8
435	Mattapoisett (west),	49	42	7	48	140	589	41
436	Milton,	36	95	9	134	96	479	120
437	Hingham,	49	49	3	20	228	1,455	132
439	Wareham (east),	40	94	—	9	163	1,029	54
	Totals,	2,282	2,820	74	965	4,305	25,141	2,285

RECORDS, ETC.—*Continued.**Division 4—Concluded.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.		All.	Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.					
1,305	2,010	3,315	14,609	17,924							
8	3	11	257	268	3	1	4	96		Bourndale and Sagamore roads, State road to Sagamore.	
43	107	150	800	950	5	11	16	84		Warehouse and Marion roads.	
16	9	25	66	91	18	9	27	73		Rochester road, near depot.	
29	42	71	791	862	3	5	8	92		Road over canal.	
38	56	94	1,224	1,318	3	4	7	93		State and road over canal.	
33	49	82	674	756	4	7	11	89		Near West Falmouth post office.	
23	8	31	502	533	4	2	6	94		Near East Sandwich.	
17	9	26	216	242	7	4	11	89		State and Cotuit roads, West Barnstable.	
17	6	23	223	246	7	2	9	91		State and Cotuit roads, Hyannis.	
32	109	141	500	641	5	17	22	78		Near Fall River Avenue.	
56	37	93	548	641	9	6	15	85		Yarmouth-Orleans Road.	
27	27	54	290	344	8	8	16	84		Yarmouth-Hyannis Road.	
72	59	131	734	865	8	7	15	85		Near Harwich Port.	
64	91	155	567	722	9	13	22	78		Junction, Brewster Road.	
104	154	258	602	860	12	18	30	70		Junction, Chatham Road.	
17	20	37	253	290	6	7	13	87		Near Eastham.	
28	112	140	667	807	3	14	17	83		Near South Seekonk post office.	
43	133	176	1,278	1,454	3	9	12	88		Providence Pike.	
39	80	119	510	629	6	13	19	81		South Main and Haywood Avenue.	
95	137	232	1,502	1,734	5	8	13	87		Between Ocean and Sea streets.	
25	6	31	158	189	13	3	16	84		Gay Head Road.	
32	30	62	234	296	11	10	21	79		Residence, J. N. Atwood, Jr.	
56	90	146	770	916	6	10	16	84		Road to neck.	
45	229	274	695	969	4	24	28	72		Near Granite Avenue bridge.	
52	69	121	1,815	1,936	3	3	6	94		Near Barnes' house.	
40	103	143	1,246	1,389	3	7	10	90		Point Independence bridge.	
2,356	3,785	6,141	31,731	37,872							

DAILY AVERAGES FROM TRAFFIC
Night Traffic, Massachusetts Highway

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	'Touring Cars, Wagons,	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
315	Lexington (west),	5	8	—	6	15	51	22
340	Saugus (east),	2	41	1	8	6	40	20
341	Chelsea,	11	100	2	36	8	36	31
342A	Somerville,	3	12	—	4	21	23	2
342B	Somerville,	6	26	—	15	32	40	14
343	Boston,	3	18	1	1	40	51	31
344	Winchester,	2	1	—	1	34	93	5
356	Watertown,	4	51	—	5	24	102	73
	Totals,	36	257	4	76	180	436	198

Metropolitan Park

1	Lynn,	43	—	3	1	395	1,902	—
2	Revere,	11	34	—	29	507	2,608	96
3	Boston,	64	3	—	8	74	274	6
4	Somerville,	10	3	1	6	260	1,241	7
5	Medford,	6	2	1	3	182	854	3
6	Somerville,	46	151	5	100	707	3,019	127
7	Milton,	93	183	3	93	572	2,593	365
8	Medford,	14	2	1	—	1,139	3,435	23
	Totals,	287	378	14	240	3,836	15,931	627

Boston Park

1	Boston,	87	38	10	21	842	2,086	23
2	Boston,	61	50	34	30	479	2,337	32
3	Boston,	243	177	279	193	608	575	352
	Totals,	391	265	323	244	1,929	4,999	407

RECORDS, ETC. — *Continued.**Commission, 7 P.M. to 7 A.M.*

TOTALS.						PERCENTAGES.						Remarks.	
HORSE-DRAWN.			Automobiles,	All Kinds.	Light.	HORSE-DRAWN.			Automobiles.				
Light.	Heavy.	All.				Light.	Heavy.	All.					
5	14	19	88	107	5	13	18	82				Waltham Street, Concord Road.	
3	49	52	66	118	3	41	44	56				Foxhill bridge, Revere-Saugus Road.	
13	136	149	75	224	5	61	66	34				East Boston end.	
3	16	19	46	65	5	24	29	71				Middlesex Avenue.	
6	41	47	86	133	4	31	35	65				South of junction, parkway.	
4	19	23	122	145	3	13	16	84				Grove Street.	
2	2	4	132	136	1	1	2	98				Arlington line.	
4	56	60	199	259	1	22	23	77				Near Waltham.	
40	333	373	814	1,187									

Commission.

46	1	47	2,297	2,344	2	-	2	98	Lynn Shore Reservation, Prescott Place.
11	63	74	3,211	3,285	-	2	2	98	Saugus River bridge.
64	11	75	354	429	15	2	17	83	Soldiers' Field Roæd.
11	9	20	1,508	1,528	1	-	1	99	Alewife Brook bridge.
7	5	12	1,039	1,051	1	-	1	99	Mystic Valley Parkway, corner Main Street, Medford.
51	251	302	3,853	4,155	1	6	7	93	Wellington bridge.
96	276	372	3,535	3,907	3	7	10	90	Mattapan bridge.
15	2	17	4,597	4,614	-	-	-	100	Malden River bridge.
301	618	919	20,394	21,313					

Department.

97	59	156	2,951	3,107	3	2	5	95	Pond and Prince streets, Jamaica Plain.
95	80	175	2,848	3,023	3	3	6	94	Commonwealth Avenue and Charles-gate East.
522	370	892	1,536	2,428	22	15	37	63	Columbia Road, Washington Street.
714	509	1,223	7,335	8,558					

DAILY AVERAGES FROM TRAFFIC

Newton

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
1	Newton,	101	268	13	76	258	1,234	324
2	Newton,	43	99	11	76	533	2,141	124
3	Newton,	68	419	23	86	254	1,334	159
	Totals,	212	786	47	238	1,045	4,709	607

Newton

1	Newton,	4	26	3	7	34	155	29
2	Newton,	4	12	3	5	91	400	9
3	Newton,	7	36	1	2	21	190	8
	Totals,	15	74	7	14	146	745	46

DAILY AVERAGES FROM TRAFFIC
RECAPITULATION.

DIVISIONS, ETC.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
	SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
	Light.	Heavy.	Light.	Heavy.			
Division 1,	1,461	1,601	151	1,013	2,725	13,771	1,144
Division 2,	1,014	658	45	322	1,065	5,045	372
Division 3,	2,828	3,534	276	1,873	7,377	32,096	3,869
Division 4,	2,282	2,820	74	965	4,305	25,141	2,285
Totals,	7,585	8,613	546	4,173	15,472	76,053	7,670
Night traffic,	36	257	4	76	180	436	198
Metropolitan Park Commission, .	287	378	14	240	3,836	15,931	627
Boston Park Department, . .	391	265	323	244	1,929	4,999	407
Newton (day),	212	786	47	238	1,045	4,709	607
Newton (night),	15	74	7	14	146	745	46

RECORDS, ETC. — *Continued.*

(Day).

TOTALS.						PERCENTAGES.						Remarks.	
HORSE-DRAWN.			Automobiles.			HORSE-DRAWN.			Automobiles.				
Light.	Heavy.	All.	Automobiles.	All Kinds.	Light.	Heavy.	All.	Automobiles.	All.	Automobiles.			
114	344	458	1,816	2,274	5	15	20	80				Washington Street, corner Centre Street.	
54	175	229	2,798	3,027	2	6	8	92				Commonwealth Avenue and Washington Street.	
91	505	596	1,747	2,343	4	21	25	75				Walnut Street, corner Washington Street.	
259	1,024	1,283	6,361	7,644									

(Night).

7	33	40	218	258	3	13	16	84	Washington Street, corner Centre Street.
7	17	24	500	524	2	3	5	95	Commonwealth Avenue, corner Washington Street.
8	38	46	219	265	3	14	17	83	Walnut Street, corner Washington Street.
22	88	110	937	1,047					

RECORDS, ETC. — *Concluded.*

RECAPITULATION.

TOTALS.						PERCENTAGES.						AVERAGE OF ALL STATIONS.						Number of Stations.
HORSE-DRAWN.			Automobiles.			HORSE-DRAWN.			Automobiles.			HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.	Automobiles.	All Kinds.	Light.	Heavy.	All.	Automobiles.	All.	Automobiles.	Light.	Heavy.	All.	Automobiles.	All Kinds.			
1,612	2,614	4,226	17,640	21,866	07	12	19	81	35	57	92	383	475	46				
1,059	980	2,039	6,482	8,521	12	12	24	76	59	54	113	360	473	18				
3,104	5,407	8,511	43,342	51,853	06	10	16	84	43	75	118	602	720	72				
2,356	3,785	6,141	31,731	37,872	06	10	16	84	42	68	110	566	676	56				
8,131	12,786	20,917	99,195	120,112	07	10	17	83	42	67	109	517	627	192				
40	333	373	814	1,187	03	28	31	69	5	41	46	102	148	8				
301	618	919	20,394	21,313	01	03	04	96	38	77	115	2,549	2,664	8				
714	509	1,223	7,335	8,558	08	06	14	86	238	170	408	2,445	2,853	3				
259	1,024	1,283	6,361	7,644	03	14	17	83	86	342	428	2,120	2,548	3				
22	88	110	937	1,047	02	08	10	90	7	30	37	312	349	3				

DAILY AVERAGES FROM TRAFFIC RECORDS TAKEN FOURTEEN HOURS

Division 1.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
100	Williamstown,	20	19	6	21	42	261	5
101	Clarksburg,	41	69	2	36	27	126	9
102	Cheshire,	20	3	1	5	72	392	6
103	Williamstown,	29	40	2	16	82	442	14
104A	Pittsfield (east),	10	18	6	24	92	361	21
104B	Pittsfield (east),	22	50	10	65	139	437	64
105A	Great Barrington,	56	28	11	34	47	269	6
105B	Great Barrington,	54	19	5	29	22	110	7
106	Sheffield,	14	1	—	4	20	155	—
107A	Pittsfield (west),	15	12	2	5	16	93	5
107B	Pittsfield (west),	31	23	4	14	63	340	19
108	Lenox (north),	29	18	8	14	120	736	55
109A	Lenox,	59	39	29	35	129	462	50
109B	Lenox,	96	46	30	20	97	504	35
110A	Stockbridge,	63	6	9	19	60	249	17
110B	Stockbridge,	33	3	5	16	68	391	11
111	Sheffield,	11	4	1	9	35	161	1
112A	Egremont,	18	—	1	6	10	37	3
112B	Egremont,	30	—	5	14	15	133	1
113	Chester,	40	32	1	18	70	387	5
114	West Springfield,	7	37	1	17	167	816	53
115A	South Hadley,	43	124	6	71	52	213	53
115B	South Hadley,	55	128	—	48	29	129	26
116	Chioppee,	23	139	1	74	194	525	125
117	Agawam,	16	44	2	19	96	351	25
118	Longmeadow,	53	28	—	30	258	1,086	89
119	Becket,	2	1	2	3	60	373	3
120	Northampton,	25	19	2	16	59	255	21
121	Chioppee,	25	102	—	28	74	265	68
122A	Wilbraham,	31	16	1	9	62	248	16
122B	Wilbraham,	36	28	1	15	117	534	36
<i>Amounts carried forward,</i>		1,007	1,096	154	734	2,394	10,841	849

EACH DAY FOR ONE WEEK, BEGINNING OCT. 10, 1915, AT 7 A.M.

Division 1.

TOTALS.					PERCENTAGES.				Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.		Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.				
26	40	66	308	374	7	11	18	82	Near Vermont line, road to Pownal.	
43	105	148	162	310	14	34	48	52	Briggsville store, near North Adams.	
21	8	29	470	499	4	2	6	94	Near Adams.	
31	56	87	533	625	5	9	14	86	Near North Adams line.	
16	42	58	474	532	3	8	11	89	Cheshire and Dalton roads, Cheshire traffic.	
32	115	147	640	787	4	15	19	81	Cheshire and Dalton roads, Dalton traffic.	
67	62	129	322	451	15	14	29	71	Junction State highway and Stockbridge roads, Stockbridge traffic.	
59	48	107	139	246	24	19	43	57	Junction State highway and Stockbridge roads, New Marlborough traffic.	
14	5	19	175	194	7	3	10	90	Under Mountain, near Bartholomew's.	
17	17	34	114	148	11	12	23	77	Hancock and Richmond roads, Richmond traffic.	
35	37	72	422	494	7	8	15	85	Hancock and Richmond roads, Hancock traffic.	
37	32	69	911	980	4	3	7	93	Pittsfield Road, foot Mattoon Hill.	
88	74	162	641	803	11	9	20	80	Stockbridge and Lee roads, Lee traffic.	
126	66	192	636	828	15	8	23	77	Stockbridge and Lee roads, Stockbridge traffic.	
72	25	97	326	423	17	6	23	77	Lenox and Lee roads, Lee traffic.	
38	19	57	470	527	7	4	11	89	Lenox and Lee roads, Lenox traffic.	
12	13	25	197	222	5	6	11	89	Canaan Road, near Blodgett's.	
19	6	25	50	75	25	8	33	67	Junction Hillsdale and Under Mountain roads, New York traffic.	
35	14	49	149	198	18	7	25	75	Junction Hillsdale and Under Mountain roads, Connecticut traffic.	
41	50	91	462	553	7	9	16	84	East of village.	
8	54	62	1,036	1,098	1	5	6	94	Near Westfield.	
49	195	244	318	562	9	34	43	57	South Hadley and Centre and Granby roads, Centre Road traffic.	
55	176	231	184	415	13	43	56	44	South Hadley and Centre and Granby roads, Granby traffic.	
24	213	237	844	1,081	2	20	22	78	Rockrimmon Road, near Springfield.	
18	63	81	472	553	4	11	15	85	Agawam, south of Whitman's Corner.	
53	58	111	1,433	1,544	3	4	7	93	In village.	
4	4	8	436	444	1	1	2	98	Top Jacob's Ladder.	
27	35	62	335	397	7	9	16	84	Near Easthampton line.	
25	130	155	407	562	5	23	28	72	South of Willimansett village.	
32	25	57	326	383	8	7	15	85	Boston and Wilbraham roads.	
37	43	80	687	767	5	5	10	90	Boston and Wilbraham roads.	
1,161	1,830	2,991	14,084	17,075						

DAILY AVERAGES FROM TRAFFIC

Division 1 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts,	Touring Cars, Wagons,	Trucks, Omnibuses,
		Light,	Heavy,	Light,	Heavy,			
	Amounts brought forward,	1,067	1,096	154	734	2,394	10,541	549
123A	Brookfield,	9	11	1	3	93	535	19
123B	Brookfield,	16	18	2	2	18	72	9
124A	Palmer,	15	16	—	10	95	570	13
124B	Palmer,	11	13	—	8	16	102	3
125	Auburn,	64	81	10	65	92	333	36
126	Parton,	35	16	—	19	26	144	24
127A	West Brookfield,	30	17	—	6	105	566	17
127B	West Brookfield,	18	19	—	4	11	55	7
128	Brimfield,	14	9	1	11	17	104	5
129	Sturbridge,	70	33	5	25	81	175	21
130	Southbridge,	40	53	2	24	54	144	25
131A	Auburn,	9	11	—	6	52	266	16
131B	Auburn,	10	12	—	6	22	93	10
132	Leicester,	23	39	3	34	130	352	25
133	Holden,	26	35	1	17	84	290	17
	Totals,	1,397	1,470	179	974	3,290	14,672	1,096

Division 2.

201	Florida,	14	4	2	4	82	387	3
202	Greenfield (north), . . .	60	26	1	13	75	339	20
203	Hathfield,	18	15	2	9	66	344	23
204	Sunderland,	96	37	1	145	45	252	22
205A	Bernardston,	49	6	2	5	35	206	13
205B	Bernardston,	23	3	2	6	18	120	2
206	Deerfield,	56	143	—	239	179	625	49
207	Hadley,	48	75	4	65	84	382	39
208	Westminster,	31	13	—	6	66	333	13
209	Ashburnham,	19	9	1	4	31	180	4
210A	Ashby,	25	10	—	8	33	157	9
	Amounts carried forward,	471	341	15	494	716	3,377	197

RECORDS, ETC. — *Continued.**Division 1 — Concluded.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.	All.				
1,161	1,830	2,991	14,084	17,075							
10	14	24	647	671	2	2	4	96		Junction Boston and North Brookfield roads.	
18	20	38	99	137	13	15	28	72		Junction Boston and North Brookfield roads.	
15	26	41	678	719	2	4	6	94		Junction Boston and Brimfield roads.	
11	21	32	121	153	7	14	21	79		Junction Boston and Brimfield roads.	
74	146	220	461	681	11	21	32	68		Near Worcester.	
35	35	70	194	264	13	13	26	74		South of village.	
30	23	53	688	741	4	3	7	93		Boston and Ware roads.	
18	14	32	103	135	14	10	24	76		Boston and Ware roads.	
15	20	35	126	161	9	13	22	78		Near top Foskett's Hill.	
75	58	133	277	410	18	14	32	68		East end, village.	
42	77	119	223	342	12	23	35	65		Near Charlton.	
9	17	26	334	360	2	5	7	93		Oxford line.	
10	18	28	125	153	6	12	18	82		Junction Oxford and Charlton roads.	
26	73	99	507	606	4	12	16	84		Near Worcester.	
27	52	79	391	470	6	11	17	83		Worcester line.	
1,576	2,444	4,020	19,058	23,078							

Division 2.

16	8	24	472	496	3	2	5	95	Whitcomb's summit.
61	39	100	434	534	12	7	19	81	Bernardston Road.
20	24	44	433	477	4	5	9	91	South of Chestnut Street.
99	182	281	319	600	17	30	47	53	East of Deerfield bridge.
51	11	62	256	318	16	3	19	81	Bernardston Hotel, Northfield traffic.
25	9	34	140	174	15	5	20	80	Bernardston Hotel, north traffic.
86	372	458	853	1,311	7	28	35	65	South of Cheapside bridge.
52	140	192	505	697	8	20	28	72	Opposite Elmwood House.
31	19	50	434	484	6	4	10	90	Fitchburg traffic.
20	13	33	215	248	8	5	13	87	Fitchburg-Winchendon Road.
25	18	43	229	272	9	7	16	84	Townsend traffic, at bridge.
486	835	1,321	4,290	5,611					

DAILY AVERAGES FROM TRAFFIC

Division 2 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons,	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	471	341	15	494	716	3,377	197
210B	Ashby,	51	19	1	10	43	253	18
211A	Templeton,	31	19	3	16	53	243	20
211B	Templeton,	45	19	2	12	45	214	14
212	Lunenburg,	56	35	18	14	117	485	12
213	Montague (east),	41	60	10	13	63	351	16
214	Orange (east),	66	21	9	49	106	537	42
	<i>Totals,</i>	761	514	58	608	1,143	5,460	319

Division 3.

300	Blackstone,	128	91	52	48	60	1,238	32
301	Franklin (west),	19	25	—	10	25	134	9
302	Uxbridge,	23	25	1	14	69	383	31
303	Sutton,	61	25	—	6	4	68	26
304	Grafton,	37	44	4	23	105	403	26
305	Holliston (south),	23	38	1	10	43	230	23
306	Natick,	10	29	—	9	144	712	50
307A	Wayland,	46	17	2	14	49	242	33
307B	Wayland,	24	17	—	10	173	938	39
308	Marlborough,	15	10	—	4	128	616	26
309	Southborough,	10	5	—	3	27	136	9
310	Shrewsbury,	39	63	—	31	169	829	32
311	West Boylston (south),	48	45	—	19	100	493	22
312A	Sterling,	26	18	—	5	43	192	25
312B	Sterling,	7	7	2	8	43	224	15
313	Ayer,	71	25	4	13	85	462	14
314A	Concord,	13	23	—	17	58	222	19
314B	Concord,	24	10	—	12	117	701	22
315	Lexington (west),	50	62	15	34	140	766	81
	<i>Amounts carried forward,</i> .	674	579	81	290	1,582	8,989	534

RECORDS, ETC. — *Continued.**Division 2* — Concluded.

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.			Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.	All.				
486	835	1,321	4,290	5,611	13	8	21	79		Fitchburg traffic, bridge.	
52	29	81	314	395	9	9	18	82		Baldwinsville-Gardner traffic.	
34	35	69	316	385	13	9	22	78		Baldwinsville-Templeton west traffic.	
47	31	78	273	351	10	7	17	83		Opposite road to school.	
74	49	123	614	737	9	13	22	78		West of watering trough.	
51	73	124	430	554	9	8	17	83		Athol line.	
75	70	145	685	830							
819	1,122	1,941	6,922	8,863							

Division 3.

180	139	319	1,330	1,649	11	8	19	81		Rhode Island line.
19	35	54	168	222	8	16	24	76		Taunton Road, near Unionville.
24	39	63	483	546	5	7	12	88		Near Blackstone line, Providence-Worcester.
61	31	92	98	190	32	16	48	52		Near Manchaug.
41	67	108	534	642	6	11	17	83		Providence-Worcester Road junction to North Grafton.
24	48	72	296	368	7	13	20	80		Near Milford line.
10	38	48	906	954	1	4	5	95		Near Wellesley line.
48	31	79	324	403	12	8	20	80		Natick Road just south of crossroads.
24	27	51	1,150	1,201	2	2	4	96		Worcester Road just east of crossroads.
15	14	29	770	799	2	2	4	96		Northborough line.
10	8	18	172	190	5	4	9	91		Near Westborough line.
39	94	133	1,030	1,163	3	8	11	89		West of center.
48	64	112	615	727	6	9	15	85		Near north end of State highway.
26	23	49	260	309	8	8	16	84		Clinton Road north of Lancaster Road.
9	15	24	282	306	3	5	8	92		Sterling Road south of Leominster Road.
75	38	113	561	674	11	6	17	83		Junction Shirley and Groton roads.
13	40	53	299	352	4	11	15	85		Harvard Road.
24	22	46	840	885	3	2	5	95		North of railroad crossing at Reformatory, Fitchburg Road.
65	96	161	987	1,148	6	8	14	86		Concord Road, Waltham Street.
755	869	1,624	11,105	12,729						

DAILY AVERAGES FROM TRAFFIC

Division 3 — Continued.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	674	579	81	290	1,582	8,989	534
316	Chelmsford,	55	46	—	30	44	156	26
317	Chelmsford,	38	48	3	50	104	440	48
318	Lowell (north),	13	5	1	1	85	429	11
319	Tyngsborough,	38	28	—	23	109	614	28
320	Tewksbury,	40	20	1	11	141	495	41
321	Andover (south),	4	10	—	5	110	674	40
322	Andover (north),	53	112	1	27	162	528	51
323	Methuen (east),	25	32	2	11	70	373	22
324	West Newbury,	68	36	—	14	58	281	29
325	Amesbury (west),	12	13	—	7	62	285	23
326A	Salisbury,	46	51	3	12	64	351	14
326B	Salisbury Square,	25	31	—	5	33	163	8
326C	Salisbury (east),	28	42	—	12	51	318	19
327	Rowley,	70	41	7	28	102	407	14
328	Hamilton,	55	25	2	23	140	406	45
329	Essex,	53	66	1	20	59	247	65
330	Gloucester (south),	12	24	3	8	80	356	102
331	Beverly (east),	97	73	14	23	186	746	58
332A	Beverly (north),	19	33	1	8	21	69	1
332B	Beverly (north),	36	78	4	26	135	620	47
332C	Beverly (north),	18	31	3	5	38	156	2
333A	Topsfield,	10	7	1	4	110	208	2
333B	Topsfield,	14	6	1	4	95	157	1
334	Middleton,	49	50	—	11	57	247	16
335	Salem (east),	14	64	2	51	142	832	153
336A	Lynnfield,	12	14	6	13	109	710	18
336B	Lynnfield,	13	9	5	14	81	529	23
337	Stoneham (north),	14	37	1	13	168	930	36
338	Woburn,	11	28	—	12	132	340	31
	<i>Amounts carried forward,</i>	1,616	1,639	143	761	4,330	21,056	1,508

RECORDS, ETC. — *Continued.**Division 3 — Continued.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.		All.	Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.					
755	869	1,624	11,105	12,729	16	21	37	63		West of Chelmsford Center.	
55	76	131	226	357	6	13	19	81		North of Lowell line.	
41	98	139	592	731	3	1	4	96		Near Tyngsborough line.	
14	6	20	525	545	5	6	11	89		North of center.	
38	51	89	751	840	6	4	10	90		Lowell Road at center.	
41	31	72	677	749	—	2	2	98		North Reading line.	
4	15	19	824	843	6	15	21	79		Lawrence Road, Frye village.	
54	139	193	741	934	5	8	13	87		Near Haverhill line.	
27	43	70	465	535	14	10	24	76		Near post office.	
68	50	118	368	486	3	5	8	92		Near Merrimac line.	
12	20	32	370	402	9	12	21	79		New Hampshire Road, north of square.	
49	63	112	429	541	9	14	23	77		Amesbury Road.	
25	36	61	204	265	6	11	17	83		Near square, Beach Road.	
28	54	82	388	470	12	10	22	78		Near Burke's Corner.	
77	69	146	523	669	8	7	15	85		Near Ipswich line.	
57	48	105	591	696	10	17	27	73		Gloucester Road at center.	
54	86	140	371	511	3	5	8	92		Near Beachmont Avenue.	
15	32	47	538	585	9	8	17	83		Near Prides' station.	
111	96	207	990	1,197	9	14	23	77		Dodge Street at crossing.	
20	41	61	91	152	4	11	15	85		Dodge Street, south of crossing.	
40	104	144	802	946	9	14	23	77		Dodge Street at crossing.	
21	36	57	196	253	5	4	9	91		Pike, south of Ipswich Street.	
11	11	22	320	342	3	3	6	94		Pike, north of Ipswich Street.	
15	10	25	253	278	12	14	26	74		West of center, taking concrete road as well.	
49	61	110	320	430	1	9	10	90		Loring Avenue, near pump station.	
16	115	131	1,127	1,258	2	3	5	95		Pike, south of Wakefield Road.	
18	27	45	837	882	3	3	6	94		Pike, Wakefield Road east of pike.	
18	23	41	633	674	1	4	5	95		Reading line.	
15	50	65	1,134	1,199	2	7	9	91		Lowell Road, near Wilmington.	
11	40	51	503	554							
1,759	2,400	4,159	26,894	31,053							

DAILY AVERAGES FROM TRAFFIC

Division 3 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	1,616	1,630	143	761	4,330	21,056	1,508
339	Lynn (east),	7	29	1	33	427	1,864	37
340	Saugus (east),	17	152	5	52	57	262	138
341	Chelsea,	66	196	18	90	37	126	85
342A	Somerville,	16	113	—	75	59	156	89
342B	Somerville,	16	152	—	114	51	144	116
343	Boston,	193	102	45	174	454	555	210
344	Winchester,	38	9	2	21	197	754	60
345	Weston,	104	53	2	47	273	1,369	95
346	Hopkinton,	38	34	1	8	58	77	13
347	Millbury (north),	168	204	30	151	300	396	106
348	Dedham (west),	15	43	1	28	107	353	29
349	Dover,	23	18	1	11	51	243	14
350	Newton,	13	53	—	28	76	434	56
351	Groton,	190	106	53	103	242	442	40
352	Ipswich,	3	1	1	2	53	250	3
353	Newbury,	116	113	3	31	73	397	14
354	Newburyport,	63	91	—	26	116	528	38
355	Dracut,	9	13	—	3	69	407	36
356	Watertown,	19	103	11	56	214	558	256
357	Revere,	39	74	19	37	76	152	141
358	Salem (west),	27	14	4	22	242	591	160
359	Gloucester (north),	13	85	1	23	31	187	50
360	Lexington (east),	33	38	3	63	86	567	34
361	Salisbury,	12	7	—	2	37	277	6
362	Gloucester (south),	81	131	15	35	152	514	223
	Totals,	2,935	3,573	359	1,996	7,868	32,689	3,557

RECORDS, ETC. — *Continued.*

Division 3 — Concluded.

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.					HORSE-DRAWN.						
Light.	Heavy.	All.	Automobiles.	All Kinds.	Light.	Heavy.	All.	Automobiles.			
1,759	2,400	4,159	26,894	31,053							
8	62	70	2,328	2,398	-	3	3	97	Saugus River bridge.		
22	204	226	457	683	3	30	33	67	Foxhill bridge, Revere-Saugus Road.		
84	286	370	248	618	14	46	60	40	East Boston end.		
16	188	204	304	508	3	37	40	60	Middlesex Avenue.		
16	266	282	311	593	3	45	48	52	South of junction, parkway.		
238	276	514	1,249	1,763	13	16	29	71	Grove Street, West Roxbury.		
40	30	70	1,011	1,081	4	2	6	94	Arlington line.		
106	100	206	1,737	1,943	6	5	11	89	Worcester Road at center.		
39	42	81	148	229	17	18	35	65	Near Milford line.		
198	355	553	802	1,355	15	26	41	59	House of Joanna T. Sullivan, North Main Street, Worcester line.		
16	71	87	489	576	3	12	15	85	Near Boston line.		
24	29	53	308	361	7	8	15	85	Needham line.		
13	81	94	566	660	2	12	14	86	Near Needham line.		
243	209	452	724	1,176	20	18	38	62	Pepperell line.		
4	3	7	306	313	1	1	2	98	Pike at Lime Brook Road.		
119	144	263	484	747	16	19	35	65	Newburyport line.		
63	117	180	682	862	7	14	21	79	Bridge.		
9	16	25	512	537	2	3	5	95	River Road at Methuen line.		
30	159	189	1,028	1,217	3	13	16	84	Near Waltham.		
58	111	169	369	538	11	20	31	69	Oak Island Street, traffic road.		
31	36	67	993	1,060	3	3	6	94	House of A. L. Packard, near line of, Salem, Highland Avenue.		
14	108	122	268	390	3	28	31	69	Rockport line.		
36	101	137	687	824	5	12	17	83	Bedford line.		
12	9	21	320	341	3	3	6	94	New Hampshire line, Beach Road.		
96	166	262	889	1,151	8	15	23	77	Cut bridge.		
3,294	5,569	8,863	44,114	52,977							

DAILY AVERAGES FROM TRAFFIC

Division 4.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
401A	Wrentham,	22	14	1	26	16	70	6
401B	Wrentham,	75	46	3	62	109	620	29
401C	Wrentham,	31	22	1	49	27	85	9
402	Westwood,	20	36	3	16	124	910	48
403	Quincy,	29	202	8	84	209	1,072	136
404	Cohasset,	22	17	5	15	81	432	61
405A	Weymouth,	20	26	3	14	9	43	10
405B	Weymouth,	15	24	—	18	75	351	40
406A	Hanover,	43	20	1	16	60	216	23
406C	Hanover,	48	27	1	21	31	132	12
406D	Hanover,	109	52	2	30	72	396	38
407	Duxbury,	23	24	—	8	43	226	15
408A	Whitman,	27	92	—	18	56	270	62
408B	Whitman,	10	34	—	5	42	193	25
409A	Easton,	17	20	—	13	53	188	22
409B	Easton,	29	34	—	19	107	538	49
410	Taunton (north),	53	84	1	11	101	391	44
411	Dighton (south),	26	33	1	10	59	277	23
412	Taunton,	27	26	—	4	45	188	13
413A	Somerset,	88	141	2	12	96	547	42
413B	Somerset,	106	68	17	30	206	348	51
413C	Somerset,	49	72	1	16	67	400	18
413D1	Somerset,	123	71	13	32	181	361	50
413D2	Somerset,	15	29	—	8	10	28	3
414	Dartmouth,	90	113	—	42	93	591	105
415A	Freetown (east),	7	12	1	5	25	156	9
415B	Freetown,	8	6	—	2	12	55	8
416	Bridgewater,	30	22	1	18	79	314	36
417	Middleborough (south),	38	47	1	11	52	311	22
418A	Plymouth,	3	2	—	2	10	71	2
<i>Amounts carried forward,</i>		1,203	1,416	66	617	2,150	9,780	1,011

RECORDS, ETC. — *Continued.**Division 4.*

TOTALS.						PERCENTAGES.						Remarks.	
HORSE-DRAWN.			Automobiles.			HORSE-DRAWN.			Automobiles.				
Light.	Heavy.	All.	Automobiles.	All Kinds.	Light.	Heavy.	All.	Automobiles.	All.	Automobiles.			
23	40	63	92	155	15	26	41	59	59	59	Boston and Franklin roads.		
78	108	186	758	944	8	12	20	80	80	80	Boston and Providence.		
32	71	103	121	224	14	32	46	54	54	54	Franklin and Boston roads.		
23	52	75	1,082	1,157	2	4	6	94	94	94	Near park.		
37	286	323	1,417	1,740	2	17	19	81	81	81	Near Fore River bridge.		
27	32	59	574	633	4	5	9	91	91	91	Near Black Rock depot.		
23	40	63	62	125	18	32	50	50	50	50	Washington and Main streets.		
15	42	57	466	523	3	8	11	89	89	89	Main Street and Washington.		
44	36	80	299	379	12	9	21	79	79	79	Junction Rockland Road.		
49	48	97	175	272	18	18	36	64	64	64	Junction Boston Road.		
111	82	193	506	699	16	12	28	72	72	72	Junction Pembroke Road.		
23	32	55	284	339	7	9	16	84	84	84	Near Hound Brook.		
27	110	137	388	525	5	21	26	74	74	74	Temple and Bedford streets.		
10	39	49	260	309	3	13	16	84	84	84	Bedford and Temple streets.		
17	33	50	263	313	5	11	16	84	84	84	Brockton Road.		
29	53	82	694	776	4	7	11	89	89	89	Stoughton Road.		
54	95	149	536	685	8	14	22	78	78	78	Westville village.		
27	43	70	359	429	6	10	16	84	84	84	Near Taunton.		
27	30	57	246	303	9	10	19	81	81	81	Near Lakeville.		
90	153	243	685	928	10	16	26	74	74	74	Brightman Street bridge traffic.		
123	98	221	605	826	15	12	27	73	73	73	Brightman Street bridge, Taunton Road.		
50	88	138	485	623	8	14	22	78	78	78	Near Slade's Ferry bridge, Warren Road.		
136	103	239	592	831	16	13	29	71	71	71	Brightman Street bridge, Providence Road.		
15	37	52	41	93	16	40	56	44	44	44	Near Slade's Ferry bridge, Providence Road.		
90	155	245	789	1,034	9	15	24	76	76	76	South Mills village.		
8	17	25	190	215	4	8	12	88	88	88	Near Webb's Corner, Taunton Road.		
8	8	16	75	91	9	9	18	82	82	82	Near Webb's Corner, Middleborough Road.		
31	40	71	429	500	6	8	14	86	86	86	South Bridgewater village.		
39	58	97	385	482	8	12	20	80	80	80	North end of road.		
3	4	7	83	90	3	5	8	92	92	92	Sagamore and Bourndale roads, Sagamore Road.		
1,269	2,033	3,302	12,941	16,243									

DAILY AVERAGES FROM TRAFFIC
Division 4 — Concluded.

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts,	'Touring Cars, Wagons,	Trucks, Omnibuses,
		Light.	Heavy.	Light.	Heavy.			
	<i>Amounts brought forward,</i>	1,203	1,416	66	617	2,150	9,750	1,011
418B	Plymouth,	3	2	-	-	7	22	1
419A	Marion,	17	29	-	17	45	226	26
419B	Marion,	18	33	-	6	14	70	10
420A	Bourne (north),	19	27	1	23	37	321	24
420B	Bourne (north),	23	36	1	24	56	468	30
421	Falmouth (west),	39	28	-	16	35	242	23
422	Sandwich,	21	14	-	-	30	291	4
423A	Barnstable (west),	16	8	-	4	14	81	16
423B	Barnstable (west),	13	9	-	4	15	70	16
424	Seekonk (north),	32	85	-	36	56	331	42
425A	Yarmouth,	50	31	-	1	40	190	6
425B	Yarmouth,	31	36	-	2	27	107	7
426	Harwich (south),	52	39	-	3	37	218	16
427A	Orleans (north),	51	85	1	7	59	196	22
427B	Orleans (north),	89	132	-	13	53	194	26
428	Wellfleet,	23	28	1	8	23	107	1
429	Seekonk (south),	26	65	2	39	80	425	71
430	Attleboro (west),	41	95	-	61	214	1,369	113
431	Brockton (south),	35	62	2	18	133	339	71
432	Barnstable (south),	82	95	1	8	133	265	44
433A	Chilmark,	23	7	-	1	4	31	7
433B	Chilmark,	13	5	-	1	3	11	1
434	Mansfield (north),	31	22	-	3	37	216	12
435	Mattapoisett (west),	39	45	7	10	85	339	34
436	Milton,	14	138	-	138	99	499	124
437	Hingham,	57	44	2	19	133	738	92
439	Wareham (east),	31	35	-	3	65	374	28
	Totals,	2,095	2,654	84	1,032	3,719	17,540	1,878

RECORDS, ETC. — *Continued.**Division 4* — Concluded.

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.			Automobiles.	All Kinds.	HORSE-DRAWN.		All.	Automobiles.			
Light.	Heavy.	All.			Light.	Heavy.					
1,269	2,033	3,302	12,941	16,243							
3	2	5	30	35	8	6	14	86	Bournedale and Sagamore roads, Bournedale Road.		
17	46	63	297	360	5	13	18	82	Wareham and Marion roads.		
18	39	57	94	151	12	26	38	62	Rochester Road near depot.		
20	50	70	382	452	4	11	15	85	Road over canal.		
24	60	84	554	638	4	9	13	87	State and road over canal.		
39	44	83	300	383	10	12	22	78	Near West Falmouth post office.		
21	14	35	235	270	8	5	13	87	Near East Sandwich.		
16	12	28	111	139	11	9	20	80	State and Cotuit roads, Hyannis.		
13	13	26	101	127	10	10	20	80	State and Cotuit roads, West Barnstable.		
32	121	153	519	672	5	18	23	77	Near Fall River Avenue.		
50	32	82	236	318	16	10	26	74	Yarmouth, Orleans Road.		
31	38	69	141	210	15	18	33	67	Yarmouth-Hyannis Road.		
52	42	94	271	365	14	12	26	74	Near Harwichport.		
52	92	144	277	421	12	22	34	66	Junction Brewster Road.		
89	145	234	273	507	17	29	46	54	Junction Chatham Road.		
24	36	60	136	196	12	19	31	69	Near Eastham.		
28	104	132	576	708	4	15	19	81	Near South Seekonk post office.		
41	159	200	1,696	1,896	2	9	11	89	Providence pike.		
40	80	120	593	713	6	11	17	83	South Main and Haywood Avenue.		
83	103	186	442	628	13	17	30	70	Between Ocean and Sea streets.		
23	8	31	42	73	31	11	42	58	Gay Head Road.		
13	6	19	15	34	38	18	56	44	Menemsha Road.		
31	25	56	265	321	9	8	17	83	Residence, J. N. Atwood, Jr.		
46	55	101	458	559	8	10	18	82	Road to neck.		
14	276	290	722	1,012	2	27	29	71	Near Granite Avenue bridge.		
59	63	122	963	1,085	5	6	11	89	Near Barnes' house.		
31	38	69	467	536	6	7	13	87	Point Independence bridge.		
2,179	3,736	5,915	23,137	29,052							

DAILY AVERAGES FROM TRAFFIC
Night Traffic, Massachusetts Highway

Station Number.	TOWN — CITY.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
		SINGLE HORSE.		TWO OR MORE HORSE.		Runabouts.	Touring Cars, Wagons.	Trucks, Omnibus.
		Light.	Heavy.	Light.	Heavy.			
315	Lexington (west),	5	7	1	3	9	45	13
340	Saugus (east),	-	32	-	11	5	32	20
341	Chelsea,	2	47	-	19	6	28	9
342A	Somerville,	2	7	-	2	23	15	4
342B	Somerville,	2	21	-	10	28	28	12
343	Boston,	3	16	-	1	37	46	19
344	Winchester,	1	2	-	1	32	82	4
356	Watertown,	9	38	1	1	23	92	38
413A	Somerset,	65	150	1	14	57	255	36
	Totals,	89	320	3	62	220	623	155

Metropolitan Park

1	Lynn,	20	-	1	-	238	1,096	-
2	Revere,	7	29	1	33	427	1,864	37
3	Boston,	192	18	2	9	114	392	7
4	Somerville,	9	3	1	-	213	1,264	5
5	Medford,	10	3	1	-	213	1,247	5
6	Somerville,	28	136	2	90	674	3,410	120
7	Milton,	169	314	18	214	1,129	3,991	397
8	Medford,	11	1	1	-	700	2,647	11
	Totals,	446	504	27	346	3,708	15,911	582

RECORDS, ETC. — *Continued.**Commission, 7 P.M. to 7 A.M.*

TOTALS.					PERCENTAGES.					Remarks.	
HORSE-DRAWN.					HORSE-DRAWN.						
Light.	Heavy.	All.	Automobiles.	All Kinds.	Light.	Heavy.	All.	Automobiles.			
6	10	16	67	83	7	12	19	81		Waltham Street, Concord Road.	
—	43	43	57	100	—	43	43	57		Foxhill bridge, Revere-Saugus Road.	
2	66	68	43	111	2	59	61	39		East Boston end.	
2	9	11	42	53	4	17	21	79		Middlesex Avenue.	
2	31	33	68	101	2	31	33	67		South of junction, parkway.	
3	17	20	102	122	2	14	16	84		Grove Street.	
1	3	4	118	122	1	2	3	97		Arlington line.	
10	39	49	153	202	5	19	24	76		Near Waltham.	
66	164	230	348	578	12	28	40	60		Brightman Street bridge traffic.	
92	382	474	998	1,472							

Commission.

21	—	21	1,334	1,355	1	—	1	99	Prescott Place, Lynn Shore Reservation.
8	62	70	2,328	2,398	—	3	3	97	Saugus River bridge.
194	27	221	513	734	26	4	30	70	Charles River, Upper Division, Soldiers' Field Road.
10	3	13	1,482	1,495	½	—	½	99½	Alewife Brook bridge, Mystic Valley Parkway.
11	3	14	1,465	1,479	1	—	1	99	Main Street and Mystic Valley Parkway.
30	226	256	4,204	4,460	½	5	5½	94½	Wellington bridge.
187	528	715	5,517	6,232	3	8½	11½	88½	Mattapan.
12	1	13	3,358	3,371	—	—	—	100	Malden River bridge, Revere Beach Parkway.
473	850	1,323	20,201	21,524					

DAILY AVERAGES FROM TRAFFIC
RECAPITULATION.

DIVISIONS, ETC.	HORSE-DRAWN VEHICLES.				AUTOMOBILES.		
	SINGLE HORSE.		TWO OR MORE HORSE.		Roadmiles,	'Touring Cars, Wagons,	Trucks, Omnibus,
	Light.	Heavy.	Light.	Heavy.			
Division 1,	1,397	1,470	179	974	3,290	14,672	1,096
Division 2,	761	514	58	608	1,143	5,480	319
Division 3,	2,935	3,573	359	1,996	7,565	32,689	3,557
Division 4,	2,095	2,654	84	1,082	3,719	17,540	1,875
Totals,	7,188	8,211	650	4,660	16,020	70,361	6,650
Night traffic,	89	320	3	62	220	623	155
Metropolitan Park Commission, .	446	504	27	346	3,706	15,911	582

RECORDS, ETC.—*Concluded.*

RECAPITULATION.

TOTALS.				PERCENTAGES.				AVERAGE OF ALL STATIONS.				Number of Stations.		
HORSE-DRAWN.			Automobiles.	HORSE-DRAWN.			Automobiles.	HORSE-DRAWN.			Automobiles.	All Kinds.		
Light.	Heavy.	All.		Light.	Heavy.	All.		Light.	Heavy.	All.				
1,576	2,444	4,020	19,058	23,078	7	10	17	83	34	53	87	414	501	46
819	1,122	1,941	6,922	8,863	9	11	20	80	48	66	114	407	521	17
3,294	5,569	8,863	44,114	52,977	6	10	16	84	45	76	121	604	725	73
2,179	3,736	5,915	23,137	29,052	8	12	20	80	38	66	104	405	509	57
7,868	12,871	20,739	93,231	113,970	7	11	18	82	40	67	107	483	590	193
92	382	474	998	1,472	6	26	32	68	10	42	52	111	163	9
473	850	1,323	20,201	21,524	2	4	6	94	59	106	165	2,525	2,690	8

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